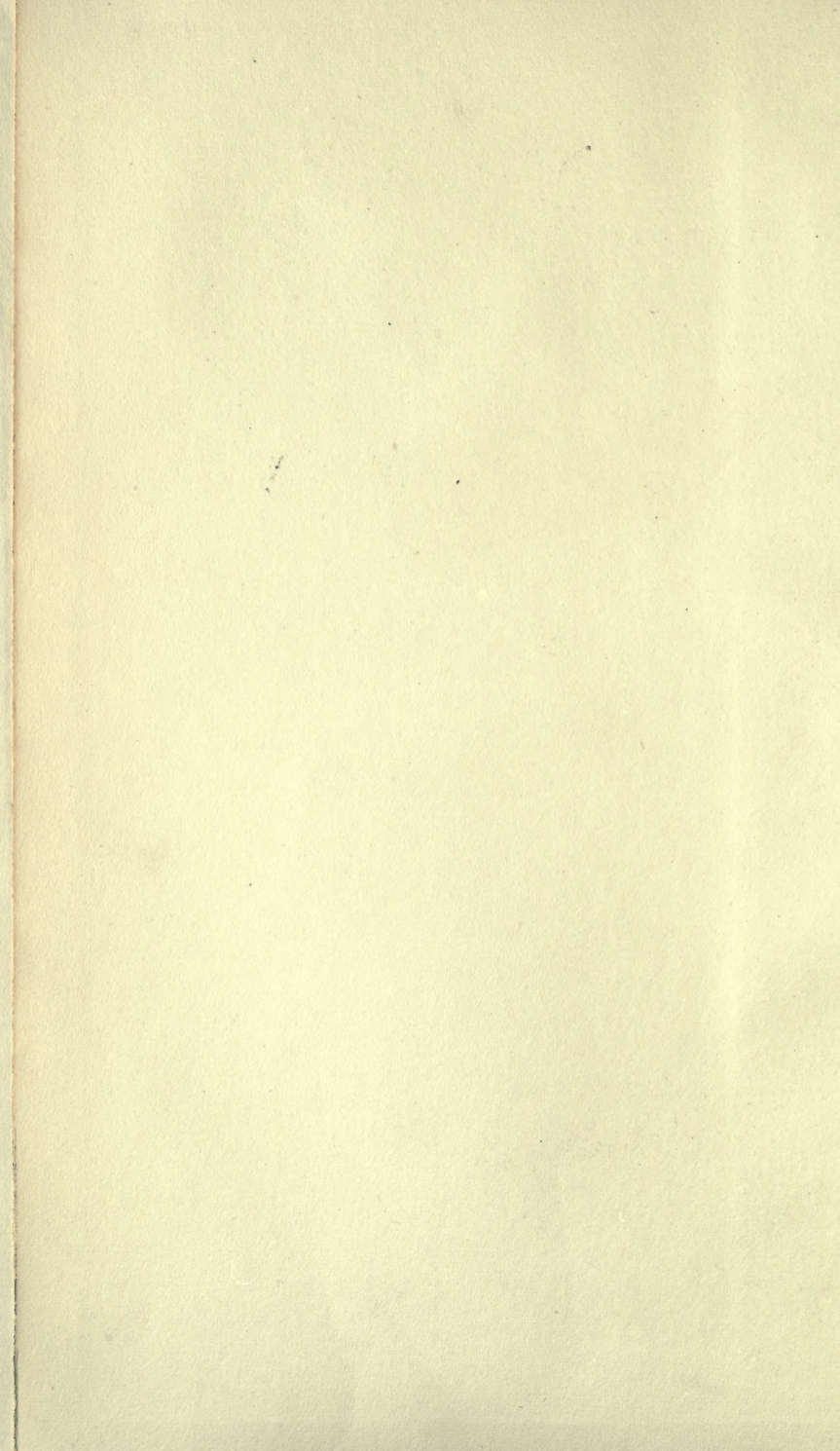


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ANNALS OF NATURAL HISTORY;

OR,

MAGAZINE

OF

ZOOLOGY, BOTANY, AND GEOLOGY,

(BEING A CONTINUATION OF THE 'MAGAZINE OF ZOOLOGY AND BOTANY,' AND
SIR W. J. HOOKER'S 'BOTANICAL COMPANION.')

CONDUCTED BY

SIR W. JARDINE, BART.—P. J. SELBY, Esq.,

DR. JOHNSTON,

DAVID DON, Esq., PROF. BOT. KING'S COLL. LOND.,

AND

RICHARD TAYLOR, F.L.S.



VOL. V.

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"Omnes res creatæ sunt divinæ sapientiæ et potentiæ testes, divitiæ felicitatis humanæ: ex harum usu *bonitas* Creatoris; ex pulchritudine *sapientia* Domini; ex œconomia in conservatione, proportionem, renovationem, *potentia* majestatis elucet. Earum itaque indagatio ab hominibus sibi relictis semper æstimata; a vere eruditis et sapientibus semper exulta; male doctis et barbaris semper inimica fuit."—
LINN.

60
9 — 17
5

CONTENTS OF VOL. V.

NUMBER XXVIII.

	Page
I. On <i>Scrophularia aquatica</i> of Linnæus and Ehrhart. By CHARLES ABBOT STEVENS, Esq., B.A., F.B.S.E. (With a Plate.).....	1
II. Catalogue of the Species of Fungi obtained in the North of Ireland, by JOHN TEMPLETON, Esq., of Cranmore, Belfast. By THOMAS TAYLOR, M.D., M.R.I.A., F.L.S.	3
III. Additions to the Fauna of Ireland. By W. THOMPSON, Esq., Vice-Pres. of the Natural History Society of Belfast	6
IV. Nonnullorum Cerambycitum novorum, Novam Hollandiam et Insulam Van Diemen habitantium, characteres. By EDWARD NEWMAN, F.L.S., &c.	14
V. Description of <i>Limneus involutus</i> , Harvey, MS. By W. THOMPSON, Vice-President of the Natural History Society of Belfast;—with an account of the Anatomy of the Animal. By JOHN GOODSIR, Esq. (With a Plate).....	22
VI. On certain characters in the Crania and Dentition of Carnivora which may serve to distinguish the subdivisions of that Order. By G. R. WATERHOUSE, Esq.	25
VII. Summary Description of Four new Species of Otter. By B. H. HODGSON, Resident at Catmandu, Nepal	27
VIII. Information respecting Botanical Travellers:—Mr. Schomburgk's Narrative of his recent Expedition in Guiana.....	29
<i>New Books</i> :—A History of British Ferns, by Edward Newman, F.L.S.	
—Iter Hispaniense, or a Synopsis of Plants collected in the Southern Provinces of Spain and Portugal, by Philip Barker Webb—	
Otia Hispanica, seu Delectus Plantarum rariorum aut nondum rite notarum per Hispanias sponte nascentium, Auctore P. B. Webb.—	
On the Organs of Secretion in Plants, by Dr. F. J. F. Meyen.—Description of a new Genus of Plants of the Family <i>Leguminosæ</i> , by	
Guglielmo Gasparini.—Observations on the duration and germination of <i>Grammitis</i> , by Guglielmo Gasparini	
36—43	
Proceedings of the Linnæan Society; Zoological Society; Microscopical Society; Royal Irish Academy	44—67
On <i>Datisca Cannabina</i> and Impregnation; On a new Genus of Cephalopoda; Derivation of the Teff and the Tocusso, two Species of	

Abyssinian Grasses; The Snake Nut; M. von Humboldt on Mr. Darwin's Voyage of the Beagle, and on Mr. Schomburgk's Expedition; Meteorological Observations and Table..... page 69—72

NUMBER XXIX.

IX. On the Structure of the Cellular Membrane in Mosses and Hepaticæ. By Dr. M. J. SCHLEIDEN 73

X. On a minute *Alga* which colours Ballydrain Lake, in the county of Antrim. By WM. THOMPSON, Esq., Vice-Pres. Nat. Hist. Society of Belfast 75

XI. Contributions towards a knowledge of the *Mollusca Nudibranchia* and *Mollusca Tunicata* of Ireland, with Descriptions of some apparently new Species of Invertebrata. By WM. THOMPSON, Esq., Vice-Pres. Nat. Hist. Society of Belfast. (With a Plate) 84

XII. On some New and Rare British *Mollusca*. By EDWARD FORBES, M.W.S., For. Sec. B.S., &c. (With a Plate) 102

XIII. Catalogue of the Species of Reptiles collected in Cuba by W. S. MacLeay, Esq.;—with some Notes of their Habits extracted from his MS. By J. E. GRAY, Esq., F.R.S. 108

XIV. Characters of Five new Species of *Orchidaceous* Plants from Dominica. By Prof. LINDLEY 115

XV. Information respecting Zoological and Botanical Travellers:—

Mr. Gould's Expedition to examine the Zoology of Australia 116

Mr. Griffith's Journal of the Mission to Bootan 119

New Books:—Observations on the Blood Corpuscles, or Red Particles, of the Mammiferous Animals, by George Gulliver, F.R.S., F.Z.S.
—Genera et Species Staphylinorum Insectorum Coleopterorum familiarum: auctore Guil. F. Erichson, &c. &c.—The Petrified Insects of Solenhofen, described by Professor Germar of Halle.—Transactions of the Berwickshire Naturalists' Club..... 125—129

Proceedings of the Linnæan Society; Tweedside Physical and Antiquarian Society; Orkney Natural History Society; Microscopical Society of London; Zoological Society.....130—139

Hirundo purpurea, Purple Marten of America; Notice respecting *Amphipeplea glutinosa*; On *Pinus pumilio*, Hk, by Professor Goepfert; On the Nests of the Fifteen-spined Stickleback, or *Gasterosteus spinachia* of Linnæus; On *Vespertilio ædilis*, Jenyns; A new Marsupial Animal; A new Species of Fossil Dolphin; On the Mineral called *Dysodil* as a product from the Shells of Infusoria, by C. G. Ehrenberg; Meteorological Observations and Table 146—152

NUMBER XXX.

XVI. On the Irregular Form of the Flower of the *Papilionaceæ*. By H. WALPERS, from the Linnæa, vgl. xiii. 153

XVII. On the Structure of the Ovule in Plants. By M. J. SCHLEIDEN, M.D., Professor of Botany in the University of Jena	page 162
XVIII. On the Bone of an unknown Struthious Bird of large size from New Zealand. By RICHARD OWEN, Esq., F.R.S.	166
XIX. Miscellanea Zoologica. By GEORGE JOHNSTON, M.D., Fellow of the Royal College of Surgeons of Edinburgh.....	168
XX. On the British <i>Actiniadæ</i> . By EDWARD FORBES, Esq. (With a Plate.)	180
XXI. A short Outline of a Fauna for Part of Herefordshire. By R. M. LINGWOOD, Esq., F.L.S.	184
XXII. Monograph of the <i>Dorylidæ</i> , a Family of the <i>Hymenoptera Heterogyna</i> . By W. E. SHUCKARD, Esq.	188
XXIII. Description of the Snake-nut Tree of Guiana. By ROBERT H. SCHOMBURGK, C.M., R.G.S. (With a Plate.)	202
XXIV. Information respecting Botanical Travellers:— Mr. Griffith's Journal of the Mission to Bootan	205
<i>New Books</i> :—A Report on the Progress of Vegetable Physiology during the year 1837, by F. J. F. MEYEN, M.D., Professor of Botany in the University of Berlin. Translated from the German, by William Francis, A.L.S.—A list of the Genera of Birds, with an indication of the Typical Species of each Genus, by George Robert Gray	211—214
Proceedings of the Zoological Society	215
Botanical Information:—"Unio Itineraria;" Note on <i>Argulus foliaceus</i> , Jurine, by Wm. Thompson, Esq.; Infusorial Animalcules in Red Snow; Meteorological Observations and Table	219—224

NUMBER XXXI.

XXV. On the recent Doctrines of Vegetable Embryology. By HERBERT GIRAUD, Member of the Council of the Botanical Society of Edinburgh. (With a Plate.)	225
XXVI. Observations on the Family <i>Helicidæ</i> , and description of a new Genus. By Dr. L. PFEIFFER of Cassel.....	238
XXVII. Some Remarks on the foregoing Paper of Dr. L. Pfeiffer, especially on the Clausium of <i>Clausilia</i> . By JOHN EDWARD GRAY, F.R.S., Keeper of the Zoological Collection in the British Museum ...	243
XXVIII. Additions to the Fauna of Ireland. By WM. THOMPSON, Esq., Vice-Pres. Nat. Hist. Society of Belfast	245
XXIX. On the "Freshwater Carriers," or <i>Thelidomus</i> of Mr. Swainson	257
XXX. Monograph of the <i>Dorylidæ</i> , a Family of the <i>Hymenoptera Heterogyna</i> . By W. E. SHUCKARD, Esq.	258

XXXI. Miscellanea Zoologica. By GEORGE JOHNSTON, Esq., M.D., &c.— <i>Beania mirabilis</i> , a new Genus of Zoophyte	page 272
XXXII. Descriptions, &c. of some rare or interesting Indigenous Insects. By JOHN CURTIS, Esq., F.L.S., &c.	274
XXXIII. Information respecting Botanical and Zoological Travellers:— Mr. Schomburgk's recent Expedition in Guiana:—Otters of Guiana.....	282
<i>New Books</i> :—A Manual of the Land and Freshwater Shells of the British Islands, with Figures of each of the kinds, by William Tur- ton, M.D. A new Edition, by John Edward Gray, F.R.S.	288
Proceedings of the Wernerian Natural History Society: Microscopical Society.....	290, 291
On a Torpedo taken on the Irish Coast, by Wm. Thompson, Esq.; Meteorological Observations and Table	292—296

NUMBER XXXII.

XXXIV. Notes on some Viviparous Plants. By GEORGE DICKIE, Esq., A.L.S., Lecturer on Botany in Marischal College, Aberdeen ...	297
XXXV. On <i>Ulex</i> . By CHARLES C. BABINGTON, M.A., F.L.S., F.G.S., &c. (With Wood Engravings.)	300
XXXVI. Miscellanea Zoologica. By GEORGE JOHNSTON. M.D., Fellow of the Royal College of Surgeons of Edinburgh:—Irish Anne- lides. (With a Plate.)	305
XXXVII. On the <i>Corymorpha nutans</i> of Sars, a remarkable Hy- droid Polype. By EDWARD FORBES, Esq., and JOHN GOODSIR, Esq....	309
XXXVIII. Monograph of the <i>Dorylidæ</i> , a Family of the <i>Hyme- noptera Heterogyna</i> . By W. E. SHUCKARD, Esq. (Concluded.)	315
XXXIX. Description of a new Species of the genus <i>Lophotus</i> , from the collection of Charles Darwin, Esq. By G. R. WATERHOUSE, Esq., Curator to the Museum of the Zoological Society, &c. &c.....	329
XL. Description of a new Species of <i>Balanus</i> , from the Cabinet of Samuel Wright, Esq., of Cork. By the Rev. W. HINCKS, F.L.S.....	333
XLI. On the Effects produced upon Animal and Vegetable Life by the Winter of 1838. By P. J. SELBY, of Twizel House.....	334
XLII. Information respecting Botanical and Zoological Travellers:— Dr. Parnell, Mr. Jerdon, Mr. Cuming, Dr. Krauss, and Mr. Schomburgk	340
Proceedings of the Zoological Society; Botanical Society of London; Royal Irish Academy; Orkney Natural History Society.....	348—360
Prize Question in Vegetable Physiology; Bottle-nosed Whale; Re- markable change of Habit in the Hare; Note on Animalcules,	

by E. Forbes, Esq.; Mr. Thompson's Notes on Irish Birds; New Species of <i>Agrilus</i> ; The Rev. Mr. Hincks on Mr. Gray's edition of Turton's Manual of Shells; Meteorological Observations and Table	page 361—368
--	--------------

NUMBER XXXIII.

XLIII. Remarks on Du Petit Thouars's Theory of the Origin of Wood. By EDWIN LANKESTER, M.D., F.L.S., &c.....	369
XLIV. On the <i>Teucrium regium</i> of Schreber. By CHARLES C. BABBINGTON, M.A., F.L.S., F.G.S., &c.	375
XLV. On the Strength of the Vital Principle in Intestinal Worms. By Dr. C. E. MIRAM, Teacher of Zoology and Comparative Anatomy in the Academy of Wilna	377
XLVI. <i>Excerpta Botanica</i> , or abridged Extracts translated from the Foreign Journals, illustrative of, or connected with, the Botany of Great Britain. By W. A. LEIGHTON, Esq., B.A., F.B.S.E., &c.	380
M. Brongniart on the Functions of the Hairs on the Stigma in the Fecundation of the Campanulaceæ.	
XLVII. Sketch of the Natural History of Leeds and its Vicinity for Twenty Miles. By HENRY DENNY, Esq.	382
XLVIII. Appendix to Mr. SHUCKARD's Monograph of the <i>Dorylidæ</i> , containing a Description of two new Species of <i>Labidus</i>	396
XLIX. Information respecting Botanical and Zoological Travellers:—	
M. Tschudy	398
Mr. Schomburgk	399
Mr. Griffith	405
<i>New Books</i> :—A History of the Fossil Fruits and Seeds of the London Clay, by James Scott Bowerbank, F.G.S., &c.—British Entomology; being Illustrations and Descriptions of the Genera of Insects found in Great Britain and Ireland: containing coloured Figures from Nature of the most rare and beautiful species, and in many instances of the Plants upon which they are found, by John Curtis, Esq., F.L.S., &c.	
Proceedings of the Microscopical Society of London; Zoological Society; American Philosophical Society	410—415
On the Flower or Fruit of Ferns; <i>Potamogeton prælongus</i> ; The Cocos de Mer; Propagation by Hybrids; Meteorological Observations and Table	415—421
Index	421—426
	427

PLATES IN VOL. V.

PLATE I. *Limneus involutus*.—*Scrophularia Ehrharti*.

II. British Mollusca.

III. *Iluanthus Scoticus*.—Snake-nut.

IV. Vegetable Embryology.

V. *Polynoë scolopendrina*.

*IV. *Nipadites Parkinsonis*.

* This Plate retains the Number (IV.) which it holds in Mr. Bowerbank's Work.

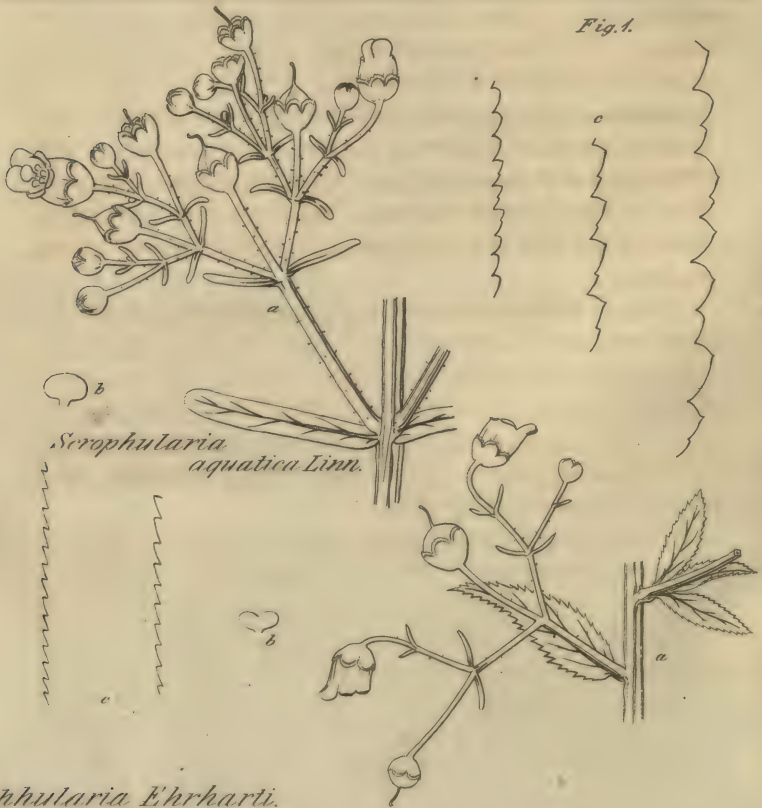
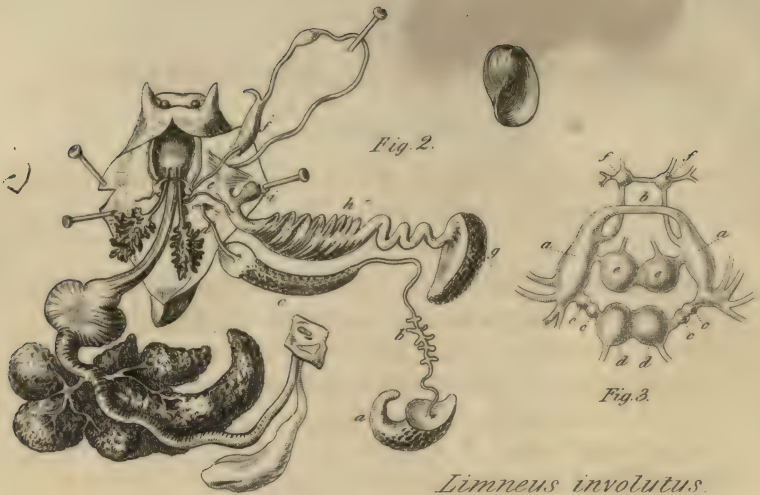
ERRATA.

Page 76, line 8 from bottom : *for latter read last.*

— 315, — 14 : *for noticed read naked.*

— 363, — 8 from bottom : *for isolating one specimen to a drop of, &c., read isolating one specimen. To a drop of, &c.*





ANNALS OF NATURAL HISTORY.

I.—On *Scrophularia aquatica* of Linnæus and Ehrhart. By
CHARLES ABBOT STEVENS, Esq., B.A., F.B.S.E.*

[With a Plate.]

AN examination, through the kindness of Professor Don, of the specimens of *Scrophulariæ* in the Linnæan and Smithian Herbaria has confirmed a suspicion I have for some time had, that under the name of *S. aquatica* two distinct species have been confounded by botanists: one, the original *S. aquatica* of Linnæus; the other the *S. aquatica* of Ehrhart's 'Plantæ Officinales.' Thus in his 'English Flora,' Sir J. E. Smith has combined the characters of the two under that name; his diagnosis, which is merely a translation from that in Linn. 'Sp. Pl.', belonging to the former plant, while to the latter his description principally refers,—not *entirely*, as some of the characters of *S. aquatica*, Linn. are mixed up in it. The fact of there being a specimen of each of the two species on the same paper in his Herbarium will account for the description having been thus drawn up from their combined characters, as he evidently considered the two as one species, and identical with *S. aquatica*, Linn.

By several German authors the plant of Ehrhart is described under the name of *S. aquatica*, while the true *S. aquatica*, Linn. is described as another species under the name of *S. Balbisii*. It seems not improbable that the combination into one of the two species by the late possessor of the Linnæan Herbarium may, for the very reason of that possession, have been the cause of their mistake.

The inspection during the last season of a great number of specimens, amounting to not less than several hundred, of *S. aquatica*, Linn. afforded me no instance of any variation in the integrity of the staminodium; nor have I ever seen any specimen at all approaching *S. aquatica*, Ehrh. in the inflorescence or in general habit. There can, I imagine, be no

* Read to the Botanical Society of Edinburgh, Feb. 13, 1840.

doubt of their distinctness. Roots are, I understand, in the possession of an eminent British botanist, who, by cultivation thereof, will doubtless be enabled shortly to determine the point beyond dispute.

In the mean time it may be useful to give the respective characters of the two plants. They are as follow :

1. *S. aquatica*, Linn. Foliis cordato-ovatis rotundato-obtusis crenato-serratis, inferioribus auriculatis, caule petiolisque alatis, panícula terminali, cymis lateralibus corymbosis multi-(8—15)-floris, laciniis calycinis subrotundis margine late scariosis, staminodio subrotundo-reniformi integro, capsula ovata subacuta.

Betonica aquatica, *Dalech. Hist.* 1356. *Ger. Em.* 715. f.

S. radice fibrosa, *Moris. Oxon.* ii. 482. s. 5. t. 8. f. 4.

S. aquatica major, *Raii Hist.* 764.

S. foliis conjugatis, &c., *Hall. Helv.* 618. *Boehm. Lips.* 66. n. 150.

S. aquatica, *Linn. Herb. Sp. Pl.* 864. *Curt. Fl. Lond.* v. t. 44. *Engl. Bot.* t. 854. *Krock. Fl. Siles.* ii. 393. *Sibth. Fl. Oxon.* 196. *Sm. Fl. Brit.* 663. *Hook. Fl. Scot.* 189. *Grev. Fl. Edin.* 137. *Sm. E. Fl.* iii. 139. (diagn. only). *Sm. Herb.* n. 2. *With Bot. Arr.* (ed. 7.) iii. 738. *Hook. Br. Fl.* (ed. 4.) 239. **Sebast. et Mauri Fl. Rom.* 205. **Pollinus Fl. Veron.* 325.

S. scorodonia (*aquatica*? *Sm. not.*) *Linn. Herb.* (without ref. to *Sp. Pl.*)

S. Balbisii, "*Hornem. Fl. Hafn.* ii. 577." *Bluff et Fingerh.* (ed. 2.) i. p. 2. 389. *Koch. Syn.* 515. **Guss. Fl. Sic. Prodr.* ii. 172.

Hab. Cambridgeshire, very common, *Mr. H. Baber*. Shropshire, common, *Mr. W. A. Leighton*. Very common in ditches and damp places in Kent, and probably general throughout England.

Perennial, July—September.

Root fibrous. Stem erect, from 2—8 feet high, branched below, mostly simple above, square, winged at the angles. Leaves ovate-oblong or elliptical, cordate at the base, very obtuse, uppermost occasionally subacute, the lower ones with one or a pair of variously shaped stalked or sessile accessory leaflets, smooth or downy beneath, doubly-, the upper ones most simply-, crenate. Petioles winged, channelled, decurrent. Panicle of many distant, mostly opposite, dichotomous, many flowered, compact, corymbose cymes. Peduncles and pedicels glandulose. Bracts linear obtuse, rarely (as in the specimen in the Linnæan Herbarium, which is, however, apparently

* For these references I am indebted to Mr. C. C. Babington.

of garden growth), developed into lanceolate acute leaves. Sterile filament rotundato-reniform, entire. Sepals with a broad membranous margin, torn at the edges. Capsules ovate, more or less acute.

2. *S. Ehrharti*. Foliis ovato-lanceolatisve basi subcordatis acutis serratis, caule petiolisque alatis, panicula terminali, cymis lateralibus laxis pauci-(4—6)-floris, laciniis calycinis subrotundis margine late scariosis, staminodio bifido laciniis divaricatis, capsula globosa obtusissima.

S. aquatica, *Ehrh. Pl. Off.* n. 156. *Sm. Herb.* n. 1. *Fl. Dan.* t. 507. *Kunth, Fl. Berol.* ii. 60. *Bluff et Fingerh.* l. c. *Rchb. Fl. excurs.* n. 2562. *Koch, Syn.* 515. **Peterm. Fl. Lips.* 459. **Host. Fl. Austr.* ii. 203. **Wimm. et Grab. Fl. Siles.* ii. 226.

Hab. Edinburgh, *Mr. W. H. Campbell*; Cramond Woods, West Lothian, *Dr. A. Hunter*. It has also, I believe, been found near Primrose Hill by *Mr. J. D. C. Sowerby*.

Perennial — ?

Root fibrous. Stem erect, 2—? feet high, simple, square, winged at the angles. Leaves ovate, ovate-oblong or lanceolate, slightly cordate at the base, acute, simply and finely serrate. Panicle of many, mostly alternate, dichotomous few-flowered cymes. Peduncles and pedicels divaricating, slightly glandulose. Bracts foliaceous lanceolate acute, simple or tripartite, in which latter case the segments are lanceolate. Sterile filament obreniform, bifid, the lobes divaricating. Sepals with a broad torn membranous margin. Capsule globose, very obtuse.

REFERENCES TO PLATE I. fig. 1.

a a. Single cymes of the two Plants.

b b. Staminodia of ditto.

c c. Margins of leaves of ditto.

II.—Catalogue of the Species of Fungi obtained in the North of Ireland, by JOHN TEMPLETON, Esq., of Cranmore, Belfast. By THOMAS TAYLOR, M.D., M.R.I.A., F.L.S.

Dunkerron, Kenmare, 12th March 1839.

THE following Catalogue of Fungi collected by the late Mr. John Templeton in the vicinity of Belfast, is drawn up from drawings and specimens left by him, and which Mrs. Templeton placed in my hands, with a desire that I should carefully ascertain the species and their modern names with a view to

* For these references I am indebted to Mr. C. C. Babington.

publication. I have bestowed upon them my best attention ; and yet the list is deficient by a few of the drawings whose counterparts I have not yet met with in nature, and by a very few of the specimens from whose imperfect state no satisfactory conclusions could be drawn. Still I cannot but admire the industry and talents of one who, at least equally successful in all the other departments of zoology and of botany, displayed so intimate a knowledge of plants difficult of investigation, at least before the termination of the last century, when the greater part of his collection was already made.

THOS. TAYLOR.

1. AGARICUS, *Linn.*

vaginatus, *Batsch.*
 muscarius, *L.*
 clypeolarius, *Bull.*
 cristatus, *Bolt.*
 eburneus, *Bull.*
 rutilans, *Schæff.*
 multiformis, *Schæff.*
 personatus, *Fr.*
 alutaceus, *Pers.*
 emeticus, *Schæff.*
 cilicioides, *Fr.*
 zonarius, *With.*
 giganteus, *Sow.*
 nebularis, *Batsch.*
 pratensis, *Pers.*
 puniceus, *Fr.*
 coccineus, *Wulf.*
 laccatus, *Scop.*
 pelianthinus, *Fr.*
 butyraceus, *Bull.*
 compressus, *Sow.*
 confluent, *Pers.*
 Clavus, *Bull.*
 Rotula, *Scop.*
 androsaceus, *L.*
 caulicinalis, *Bull.*
 galericulatus, *Scop.*
 purus, *Pers.*
 corticola, *Bull.*
 stellatus, *Fr.*
 umbelliferus, *L.*
 fragrans, *Sow.*
 flabelliformis, *Bolt.*
 applicatus, *Batsch.*
 fertilis, *Pers.*
 pascuus, *Pers.*
 evernius, *Fr.*
 gentilis, *Fr.*
 sublanatus, *Sow.*
 bulbosus, *Sow.*
 scaurus, *Fr.*
 aureus, *Bull.*
 squarrosus, *Müll.*
 mutabilis, *Schæff.*

collinitus, *Sow.*
 fastibilis, *Pers.*
 flavidus, *Schæff.*
 scaber, *Müll.*
 geophyllus, *Bull.*
 tener, *Schæff.*
 involutus, *Batsch.*
 variabilis, *Pers.*
 Georgii, *With.*
 campestris, *L.*
 semiglobatus, *Batsch.*
 fascicularis, *Huds.*
 semiovatus, *Sow.*
 Boltoni, *Pers.*
 disseminatus, *Pers.*
 atramentarius, *Bull.*
 micaceus, *Bull.*
 cinnamomeus, *L.*
 personatus, *Fr.*
 fragilis, *Batsch.*
 dilutus, *Pers.*
 cohærens, *Pers.*
 cyathiformis, *Bull.*
 chalybeus, *Pers.*
 Bulliardii, *Temp.*

2. CANTHARELLUS, *Adans.*

cibarius, *Fr.*
 lobatus, *Pers.*
 lævis, *Fr.*

3. MERULIUS, *Hal.*

corium, *Grev.*
 lachrymans, *Wulf.*

4. POLYPORUS, *Mich.*

lentus, *Berk.*
 squamosus, *Huds.*
 perennis, *L.*
 giganteus, *Pers.*
 versicolor, *L.*
 pallescens, *Fr.*
 radiatus, *Sow.*
 medulla panis, *Jacq.*
 ferruginosus, *Schrad.*

5. BOLETUS, *Dill.*

luteus, *L.*
 bovinus, *L.*
 piperatus, *Bull.*
 subtomentosus, *L.*
 edulis, *Bull.*

6. FISTULINA, *Bull.*
 hepatica, *With.*

7. HYDNUM, *Linn.*
 repandum, *L.*

8. THELEPHORA, *Ehrh.*

epidermea, *Pers.*
 cœrulea, *Schrad.*
 aurantiaca, *Sow.*
 calcea, *Pers.*
 purpurea, *Pers.*
 rubiginosa, *Schrad.*
 hirsuta, *Willd.*
 laciniata, *Pers.*

9. CLAVARIA, *Vaill.*

coralloides, *L.*
 rugosa, *Bull.*
 pistillaris, *L.*
 vermicularis, *Sow.*
 tuberosa, *Sow.*
 cornea, *Batsch.*
 inæqualis, *Müll.*
 pratensis, *Pers.*

10. GEOGLOSSUM, *Pers.*
 glabrum, *Pers.*

11. MITRULA, *Fr.*
 paludosa, *Fr.*

12. TYPHULA, *Fr.*
 erythropus, *Fr.*

13. PISTILLARIA, *Fr.*
 puberula, *Berk.*

14. *HELVELLA*, Linn.
lacunosa, Afz.

15. *LEOTIA*, Hill.
lubrica, Scop.

16. *PEZIZA*, Dill.
vesiculosa, Bull.
humosa, Fr.
coccinea, Jacq.
brunnea, Alb. & Schw.
scutellata, L.
stercorea, Pers.
virginea, Batsch.
calycina, Schum.
inflexa, Bolt.
Calyculus, Sow.
citrina, Hedw.
lenticularis, Bull.
cinerea, Batsch.
acicularis, Bull.
aurantia, Pers.
aquatica, DeCand.
cochleata, Bull.
lycoperdioides, DeCand.
nivea, Hedw. fil.
villosa, Pers.
papillata, Pers.

17. *BULGARIA*, Fr.
sarcoides, Jacq.

18. *TREMELLA*, Dill.
mesenterica, Retz.
albida, Smith.
sarcoides, With.
difformis, With.

19. *DACRYMYCES*, Nees.
stillatus, Nees.

20. *SCLEROTIUM*, Tode.
complanatum, Tode.
durum, Pers.

21. *NIDULARIA*, Bull.
Crucibulum, Pers.

22. *SPHÆROBOLUS*, Tode.
stellatus, Tode.

23. *PILOBOLUS*, Tode.
crystallinus, Tode.

24. *SPHÆRIA*, Hall.
militaris, L.
Hypoxylon, L.
carpopbila, Pers.
fragiformis, Pers.
fusca, Pers.
stigma, Hoffm.

disciformis, Hoffm.
flavo-virens, Hoffm.
coccinea, Pers.
aurantia, Pers.
byssiseda, Tode.
moriformis, Tode.
Pulvis pyrius, Pers.
ocellata, Fr.
Tiliae, Pers.
Gnomon, Tode.
punctiformis, Pers.
Agopodii, Pers.
Vaccinii, Sow.
Taxi, Sow.
rimosa, Sow.
Ilicis, Schleich.
lanciformis, Fr.
spermoides, Hoffm.
acuta, Hoffm.
serpens, Pers.

25. *DOTHIDEA*, Fr.
typhina, Pers.
Geranii, Fr.

26. *RHYTISMA*, Fr.
Acerinum, Pers.

27. *PHACIDIUM*, Fr.
coronatum, Fr.

28. *HYSTERIUM*, Tode.
pulicare, Pers.
Fraxini, Pers.
conigenum, Mong. et N.
Rubi, Pers.
Pinastri, Schrad.
Juniperi, Grev.

29. *BOVISTA*, Dill.
nigrescens, Pers.

30. *LYCOPERDON*, Tourn.
cælatum, Bull.

31. *ELAPHOMYCES*, Nees.
granulatus, Alb. et Schw.

32. *ÆTHALIUM*, Link.
septicum, L.

33. *SPUMARIA*, Pers.
alba, Bull.

34. *DIDYMIUM*, Schrad.
physaroides, Pers.

35. *PHYSARUM*, Pers.
sinuosum, Bull.

36. *CRATERIUM*, Trentepohl
minutum, Leers.

37. *STEMONITIS*, Gled.
fusca, Roth.
ovata, Pers.
typhina, Pers.
38. *DICTYDIUM*, Schrad.
umbilicatum.

39. *ARCYRIA*, Hill.
incarnata, Pers.
lutans, Bull.

40. *TRICHIA*, Hall.
chrysosperma, DeCand.
varia, Pers.

41. *PERICHÆNA*, Fr.
populina, Fr.

42. *LICEA*, Schrad.
cylindrica, Fr.
fragariformis, Nees.

43. *ONYGENA*, Pers.
equina, Pers.

44. *STILBUM*, Tode.
vulgare, Tode.
bicolor, Pers.

45. *MUCOR*, Mich.
caninus, Pers.
Mucedo, L.

46. *EUROTIIUM*, Link.
Herbariorum, Lk.

47. *CLADOSPORIUM*, Link.
Herbarum, Lk.

48. *DEMATIUM*, Pers.
ciliare, Pers.

49. *ASPERGILLUS*, Mich.
glaucus, Lk.

50. *STACHYLIDIUM*, Lk.
diffusum, Fr.

51. *CERATIUM*, Alb. et S.
hydroides, Alb. et S.

52. *BOTRYTIS*, Mich.
vera, Fr.

53. *MONILIA*, Hill.
racemosa, Pers.

54. *FUSARIUM*, Lk.
tremelloides, Grev.

55. *AREGMA*, Fr.
bulbosum, Fr.
mucronatum, Fr.

56. *PODISOMA*, Lk.
Juniperi Sabinæ, Pr.

57. PUCCINIA, Pers. Graminis, Pers. Epilobii, DeCand.	59. HIMANTIA, Pers. candida, Pers.	Senecionis, Schlecht. Violarum, DeCand. Ruborum, DeCand. Leguminosarum, Lk.
58. ÆCIDIUM, Pers. Grossulariæ, DeCand.	60. UREDO, Pers. Segetum, Pers. Caries, DeCand. Labiatarum, DeCand.	candida, Pers. Lini, DeCand. Rubigo, DeCand.

III.—*Additions to the Fauna of Ireland.* By W. THOMPSON, Esq., V. Pres. of the Natural History Society of Belfast.

MAMMALIA.

DELPHINUS MELAS, Traill. This species is stated by Robert Ball, Esq. of Dublin, to be occasionally driven ashore in large herds on the southern coast of Ireland, and to be of frequent occurrence in the month of June at Youghal. Here a herd of seventy-five came ashore a few years ago, of which the average size was from 11 to 18 feet, but one individual had attained to 22 feet in length. When visiting the South Islands of Arran (off the coast of Clare) in June 1834, accompanied by Mr. Ball, a portion of the skeleton of a *D. melas* was found by us on the beach. On this gentleman revisiting the same islands in the following summer, he saw the remains of a herd of these animals lying where they had perished: the inhabitants speak of them as common.

AVES.

SOMATERIA SPECTABILIS, Leach. King-Eider. A female specimen of this rare British bird was shot in Kingstown harbour near Dublin about the 1st of Oct. 1837, and a few hours afterwards came into the possession of Mr. R. Ball. When first seen it was accompanied by two others.

LESTRIS RICHARDSONII, Swains. Richardson's Skua. An adult *Lestris* shot at Malahide, county of Dublin, in September 1837, and in the collection of Dr. Farren of Feltrim, exhibits characters much in unison with what are considered to be two species, the *Lest. Richardsonii*, and the *Stercorarius cephus*, Leach, (Fauna Bor.-Amer. vol. ii. p. 432.) agreeing with the latter in dimensions, and with the former in colouring. At the same time it in size approaches the *L. Richardsonii* as described by Jenyns (Man. Brit. Vert. Anim. p. 282.) as nearly as his does the original description in the 'Fauna Bor.-Amer.' (vol. ii. p. 433). The following table contains the comparative measurements:—

	<i>Lest. Richardsonii</i> , Swainson.		<i>L. Richardsonii</i> , Jenyns.		<i>Stercorarius cepphus</i> , Leach.		<i>Lestris</i> , Irish specimen.	
	in.	lin.	in.	lin.	in.	lin.	in.	lin.
Length, total.....	22	8	21	0	19	0	19	9
— excluding central tail feathers... }	19	6	18	0	16	0	16	9
— of wing.....	13	6	13	0	13	0	12	6
— of bill above.....	1	1	1	2½	1	2	1	3*
— of bill to rictus .	1	10	1	9½	2	0	1	10
— of tarsus	1	10	1	9	1	8	1	9
— of middle toe } and nail	1	9½	1	8½	0	0	1	7½

Two longest tail feathers very much acuminate, the others increasing gradually in length from sides to centre, those next in length to the two central ones exceeding the outer feathers by one inch; breadth of bill at base 6 lines.

Top of head, back, upper surface of wings and tail blackish brown, varying in some places to blackish; entire under surface likewise dark-coloured, except the tail feathers which show a little white beneath; patch from the eye downwards pale straw colour. This colouring is in accordance with that of the *L. Richardsonii* of Fauna B. A. Mr. Jenyns remarks that the species is subject to considerable variation of colour in the adult state:—his description of its plumage accords tolerably well with that of *S. cepphus*.

I should have set down the Irish *Lestris* simply as a small individual of *L. Richardsonii*, had not its general accordance with *S. cepphus* at the same time suggested whether it might not as well be considered this bird, and consequently whether these terms apply to two really distinct species. An examination of specimens would at once decide the question†.

ANSER FERUS, Steph. Wild Goose. In the collection of R. Ball, Esq. there is a specimen of this goose purchased by him in Dublin market early in the winter of 1837, and which was stated to have been shot in this country; two others of this species were exposed for sale at the same time. Judging from its small size, the specimen is a female: it displays the blackish markings disposed irregularly over the lower part of the breast and the belly, which Temminck considers indicative of very old individuals of both sexes (Man. d'Orn. l'Eur. t. 2. p. 819.). These markings have generally been unnoticed

* Following the curve; the others may have been measured in a straight line.

† Since the above was written the 4th part of Temminck's 'Manuel' has been published, and here *S. cepphus* appears as a synonym of *L. parasiticus* (p. 502.). The description of *S. cepphus* would indeed seem about equally applicable to a small *L. Richardsonii* or a large *L. parasiticus*.

in the descriptions of the species. This is the first Irish specimen of the true Wild Goose or Grey Lag, that I have seen, the Bean Goose being in this country, as in England and Scotland, the common species, and with the White-fronted, to be seen in our markets every winter. *Anser ferus* is the scientific appellation bestowed on the wild-goose noticed in some of our county histories, but as it there appears to the exclusion of the two more common species just named and has not a place in Mr. Templeton's catalogue of Irish Birds, I introduce it here. At the same time there is little doubt that the true *A. ferus* is the species alluded to in Rutt's 'Natural History of Dublin' as the "larger sort which stays and breeds here, particularly in the bog of Allen," vol. i. p. 333; similar allusions to it appear in one or two other county histories.

Mr. Jenyns considers it "highly improbable" that the domestic goose has been derived from this species. (Manual, p. 222.) After a careful comparison of the individual under consideration with the domestic species, I cannot perceive any difference except in the superior size of the latter, the result I presume of domestication. The form of the bill in the *A. ferus* is quite identical with that of the tame goose, and at once distinguishes it from *A. segetum* and *A. albifrons**.

REPTILIA.

CHELONIA CAOUANA, Schweigger. *Testudo caretta*, Linn.

Loggerhead Turtle, Shaw, Gen. Zool. vol. iii. p. 85, pl. 23.

To the kindness of H. H. Dombrian, Esq. of Dublin, I owe the opportunity of examining a turtle of this species hitherto unnoticed on the British shores, which was obtained on the coast of Donegal in May 1838, and soon afterwards came into his possession. The specimen, about a foot in length, was taken by a man engaged in collecting sea-weed for manure, and who finding the hook at the end of the long pole used for "hauling in the rack," had caught in something, carefully drew it towards him, when the captive proved to be a living turtle whose eye the hook had entered. Mr. R. Ball informs me that a turtle of this species in his collection was taken alive in the sea near Youghal, but he has been inclined to regard it merely

* *Totanus Glareola*, Temm. Mr. R. Ball has described to me a species of *Totanus* which he saw for several years about the month of June frequenting a stream in Glenbowe Wood near Youghal, and believed to be this bird.

In the late Mr. Templeton's MS. a sandpiper considered to be of this species is noticed as having been seen in the neighbourhood of Belfast, but as in the previous instance in terms which do not warrant its introduction to the Fauna with certainty.

as an individual washed off the deck of a vessel, or one that had escaped from the cord which was intended to secure it, when (as is a common custom on board ship) it may have been committed to the sea for the benefit of a swim. However, as both the specimens which have been procured on the Irish coast are of the same species, and one which according to Dumeril and Bibron is very common in the Mediterranean, and of occasional occurrence in the Atlantic Ocean, they may by the natural influence of winds and waves have been carried to our shores. This remark would from the circumstance of its frequenting the same seas likewise apply to the much rarer species, the Leathery Turtle, *Sphargis coriacea*, which has been taken on the English coast. The Hawks-bill Turtle, *Chelonia imbricata*, now included in the British Fauna, may more probably than the other two species, have been washed off the decks of vessels or outlived their wreck, its native abode being so far remote from the British seas as the West Indies and the Indian Ocean*.

PISCES.

SCOMBER THYNNUS, Linn. Tunny. Dr. Jacob (Professor of Anatomy in the Royal College of Surgeons) of Dublin, informs me, that during the herring season about twelve years ago he purchased a specimen of this fish about 2 feet in length, (and evidently a recent capture,) from a fisherman who supplied him with the rare species he procured, and whose ordinary fishing-ground was off Dublin Bay, within forty miles of the metropolis.

GOBIOUS UNIPUNCTATUS, Parnell. One-spotted Goby. 'Wern. Mem.' vol. vii. p. 83, pl. 29. I have obtained this on the north-east coast of Ireland; and in Mr. R. Ball's collection there is a specimen, 3 inches in length, which was procured at Glendore (county Cork) by Mr. Geo. J. Allman. Although well-marked individuals of *G. unipunctatus* may appear specifically different from *G. gracilis* and *G. minutus*, yet from having remarked some specimens intermediate in character between the two first mentioned, I am led to doubt whether in these days of refinement the old *Gobius minutus* has not been multiplied into too many species.

CYCLOPTERUS CORONATUS, Couch. Coronated Lump-fish. 'Cornish Fauna,' p. 47. 'Annals Nat. Hist.' vol. ii. p. 382. Of this fish, considered by Mr. Couch distinct from the *C. lumpus*, I procured two specimens, rather exceeding 10 lines in length, by dredging in

* All the localities noted by Dumeril and Bibron, except Havanna, are within, or bordering on the Indian Ocean.—Erpétologie Générale, tome ii. p. 551.

Strangford lough on the 1st of Oct.; the particular date is mentioned in reference to the question whether the *C. coronatus* may not be the young of *C. lumpus*. Without offering any opinion on this point, it seems to me proper to notice the capture of this minute fish elsewhere than on the coast of Cornwall, where one individual only has been observed.

MOLLUSCA*.

"*Nautilus calcar*†, Mont. Miltown Malbay (co. Clare), in sand."

W. H. Harvey, Esq.

"——— *lævigatulus*, Mont. Ditto." Ditto.

"*Vermiculum intortum*, Mont. On a sponge from Strangford."

Templeton's MS.

"*Lagenula* (Flem.) *striata*, Mont. Among sand at the Whitehouse Point [Belfast bay], Oct. 1810." Temp. MS.

"——— *globosa*, Mont. Among *Conserva pennata*, Belfast Bay."

Temp. MS.

"——— *lævis*, Walk. M. Malbay, rare—in sand." W. H.

Harvey.

"*Orthocera glabra*. Flem. Ditto." Ditto.

——— *trachea*. Flem. Ditto. Ditto.

Miliola ovata, Crouch, Illust. Lamarck, p. 40. pl. 20. f. 11. Common on the north, east, and south coast.

"*Loligo media*†. Specimens occasionally received from Dublin harbour, Strangford lough, and other inlets." Temp. MS.

"*Octopus vulgaris*, Lam. Not uncommon." Temp. MS.

"*Arion ater*, var. *rufus*, var. *marginatus*. Common." Temp. MS.

* These having been mostly communicated to me (in 1835) in the order and under the names in which they appear in Fleming's 'British Animals,' are chiefly so arranged, and thus some genera, &c. on which new light has been thrown, still appear under their old appellations. The multiplication of habitats has not been thought of in an article like the present, in which I am particular only about noting the place (in so far as I am informed) where the species occurred to those who in this country first studied and determined them.

Notices of Irish mollusca are so widely scattered, that I may, after having taken considerable care, still be in error respecting the introduction of some species as "additions" to the Fauna.

† *Spirula australis*, published many years ago as found by Mr. O'Kelly on the coast of Kerry, is mentioned in the late Mr. Templeton's MS. as having been obtained "near Whitehouse," Belfast Bay; and at Portrush near the Giant's Causeway, by Mrs. Clewlow. Mr. R. Ball has procured it near Youghal, as Mr. W. H. Harvey once did on the coast of Clare.

‡ This is indicated as Irish in the abstract of a paper by Mr. R. Ball just published in the Proceedings of the Royal Irish Academy: with this explanation the species is here retained in consequence of the late Mr. Templeton's note on it.

"*Arion hortensis*, Fer. Common at Cranmore [Belfast]." Temp. MS. Coloured drawings of the var. of this species named *A. circumscriptus* by Dr. Johnston were made by Mr. Templeton in 1808.

"*Limax agrestis*, Gmel. Common." Temp. MS.

—— *variegatus*, Fer. (Hist. de Moll. p. 71. pl. 5. f. 1—6.) Youghal in Mr. Ball's collection.

Helix concinna, Jeff. Common in Ireland, especially in the north.

Succinea gracilis, Alder. Widely diffused in Ireland. Mr. Alder, I believe, now rather considers this to be a variety of *S. amphibia*.

Limneus lacustris. *Gulnaria lacustris*, Leach. Found in Lough Neagh and lakes generally.

Lottia ? *pulchella*, Forbes. 'Malac. Monensis,' p. 35. 'Mag. Nat. Hist.' viii. p. 591. f. 61. In Mr. Hyndman's collection (Belfast) are a few small specimens of this shell—the first obtained on the shore of Belfast Bay by Mrs. M'Gee, the others found by Mr. H. adhering to oysters in Belfast market in 1831.

Patella ? *Forbesii*, Smith, 'Wern. Mem.' vol. viii. p. 107. pl. 2. One of this species was found by Miss M. Ball several years ago in company with *Orbicula Norvegica*, Lam. on a stone dredged in very deep water at Youghal.

—— ? *ancyloides*, Forbes, MS. Obtained by Mr. Hyndman many years ago on oysters from Strangford lough. Length 3 lines, breadth $2\frac{3}{4}$, height $1\frac{3}{4}$. The great resemblance this shell bears to the *Ancylus fluviatilis* is not confined to external appearance, but internally it exhibits the same blueish cast.

"*Dentalium striatulum*. Found in sand near Cove." Mr. John Humphreys. Portmarnock, Mr. Warren.

"*Chiton ruber*, Linn. Among oysters from Killinchy, Down." Temp. MS. Found by Mr. Hyndman and myself in different localities on the north-east coast.

—— *albus*, Mont. As last.

—— *fuscatus*, Brown. Ditto.

Aplysia depilans, Linn. Youghal and Dublin, R. Ball, Esq. M. Malbay, W. H. Harvey, Esq. Obtained by dredging in Belfast and Strangford loughs by Mr. Hyndman and myself.

"—— *punctata*, Cuv. Dublin." R. Ball, Esq.

"*Bulla catena*, Mont. M. Malbay, rare. A beautiful little species about a line in length marked with elegant chain-like bands." W. H. Harvey, Esq.

—— *striata*, Brown, Illust. pl. 38. f. 41, 42. Bangor, co. Down. Mr. Hyndman.

Littorina saxatilis, Bean, MS. Northern and eastern coasts: common.
Eulima Donovanii, Forbes. 'Mal. Mon.' p. 15. Youghal and Dublin,
 R. Ball, Esq. Dredged off Dundrum, co. Down, by Mr. Hyndman and myself.

—— *Jeffreysii*. Dublin coast, Mr. Ball and Mr. Warren.

—— *bilineata*, Jeff. A *Eulima* so named by Mr. Jeffreys is in the collection of Mr. Warren, who found it at Portmarnock.

"*Rissoa striatula*. *Turbo monilis*, Turton. M. Malbay, rare." W. H. Harvey, Esq.

—— *alba*, var. Brown. Youghal, Miss M. Ball.

Odostomia unidentata, Flem. Youghal, R. Ball, Esq.; M. Malbay, not rare; W. H. Harvey, Esq.

Natica Alderi, Forbes, 'Mal. Mon.' p. 31. Of frequent occurrence in north, east, and south of Ireland, and hitherto passing under the name of *N. canrena*.

Marginella voluta. M. Malbay, rare; W. H. Harvey; Macgilligan (co. L. Derry) and Belfast Bay, G. C. Hyndman; South Islands of Arran, R. Ball.

Auricula bidentata, Fer. Youghal and Portmarnock, R. Ball.

"*Buccinum ovum*. [Turt. 'Zool. Journ.' vol. ii. p. 366. pl. 13. f. 9.] Found in the intestines of a Red Gurnard brought to Cork market." Mr. John Humphreys.

"*Cerithium tubercularis*. (*Murex tubercularis*, Mont.) M. Malbay, common." W. H. Harvey, Esq.

Cerithium Pennantii, mihi. *Turbo tuberculata*, Penn. 'Brit. Zool.' vol. iv. p. 129. pl. 82. f. 111. *Terebra fuscata*, Flem. 'Brit. Anim.' *Cerithium fuscatum*, Brown, 'Illust. Conch.' p. 9. pl. 5. f. 67. Of this shell there is a specimen from Youghal in Miss M. Ball's collection, agreeing with the descriptions of Fleming and Brown, but only tolerably represented in the above-quoted figures. Mr. E. Forbes having informed me that the *Turbo tuberculata* of Linn. is a different shell, and that the *Cerithium* to which Costa applied the name of *C. fuscatum* is likewise distinct, I have considered it necessary to bestow a new name on the present species.

"*Fusus gyrinus*. Clare and Youghal." R. Ball, Esq.

Lamellaria tentaculata, Mont. 'Linn. Trans.' xi. 186. pl. 12. f. 5, 6. Johnston, 'Mag. Nat. Hist.' ix. 229. f. 25. In January 1835 two small individuals, about 4 lines in length, of this rare species were dredged in Strangford lough by Mr. Hyndman and myself.

"*Pecten glaber*. Found in the intestines of a Haddock bought in Cork market." Mr. John Humphreys.

"*Anomia punctata*. Youghal." R. Ball, Esq.

"*Hyalea trespino*s*a*, Griff. Cuvier, Moll. pl. 3. f. 7." An individual of this species and the first *Pteropode* I believe that has occurred on the British shores, was found by Mr. R. Ball on the coast near Youghal some years ago. At the same time *Spirula* and *Ianthina* occurred, but none of them in a living state.

"*Arca fusca*. Coast of Galway." R. Ball, Esq., who considers its rank as a species doubtful.

Nucula tenuis. Found at Portmarnock by T. W. Warren, Esq.

—— *nitida*, Sowerby. Coast of Dublin.

Pinna fragilis, } Turt. Bivalves. The three first named noted by
—— *papyracea*, } Mr. John Humphreys as found at Cove; the two
—— *pectinata*, } first and *P. muricata* by Mr. R. Ball as obtained
—— *muricata*, } from the same locality. As species they are
looked upon with much doubt.

*Cardium nodosum**, Mont. North and east coasts. This shell is noticed by Mr. Smith as found in the newer pliocene deposits in Ireland. 'Wern. Mem.' vol. viii. part 1.

Anodon intermedius, Lam. I have found this in the rejectamenta of the river Lagan near Belfast.

—— *cellensis*, Pfeif. River Shannon and Grand Canal. The *An. anatinus* and *An. cygneus* have been recorded as Irish. Although enumerating these, I am not disposed to take the views of authors who make so many species in this genus.

"*Amphidesma distortum*. Youghal." R. Ball, Esq.

"*Donax complanata*. Bantry Bay, rare." Mr. J. Humphreys.

"*Tellina similis*. Dublin." R. Ball.

"—— *bimaculata*. Bantry." R. Ball. This species is given doubtfully as Irish in Mr. O'Kelly's catalogue.

Tellimya ovata, Brown's 'Illust. Brit. Conch.' pl. 14. f. 20, 21. Specimens of this shell from the southern coast are in Mr. Hyndman's cabinet.

Myrtea spinifera, Turt. Bantry Bay. Miss M. Ball. Marked with doubt by Mr. O'Kelly as a Portmarnock shell. It has been indicated as an Irish species by Mr. Jeffreys when noticing the mollusca he obtained at Oban in Argyleshire: he remarks that

* *Mytilus edulis*, Linn. The variety? *M. subsaxatilis*, Williamson, 'Mag. Nat. Hist.' vii. 353. has been found at Youghal by Miss M. Ball. The var. *M. incurvatus* monopolizes, almost to the exclusion of the other forms of this species, the shores of Ireland that are exposed to the swell of the ocean.

Venus virginea, Linn. The var. *V. Sarniensis*, Turt. dredged on the Dublin coast by Dr. Lloyd of Malahide.

the individuals here procured were "only half the size of the Irish specimens." Sowerby's 'Malac. and Conch. Mag.' No. 2. p. 43.

"*Cyprina minima*. M. Malbay, rare." W. H. Harvey. Bantry Bay. Mr. J. Humphreys.

Pisidium obtusale, Pfeif. ? Jenyns, I have collected in a few localities in the north-east of Ireland.

——— *cinereum*, Alder. As last. La Bergerie, Queen's county, Rev. B. J. Clarke.

"*Teredo bipennata*. From the mast of a vessel cast ashore at Youghal." R. Ball. M. Malbay, W. H. Harvey.

"*Xylophaga dorsalis*. In rotten wood at Ringsend, Dublin." W. H. Harvey*.

Montacuta purpurea. *Mya purpurea*, Mont. Abundant on the north-east coast. It was this species and not *Kellia rubra* that was found in the stomach of mullet as noticed in 'Annals Nat. Hist.' vol. i. p. 354. *K. rubra* also occurs on the Irish shores.

Pandora obtusa, Leach, Lam. Penn. 'Brit. Zool.' vol. iv. pl. 64. (three lowest figures) ed. 1777 : same work, ed. 1812. *Solen pinna*, vol. iv. p. 175. pl. 67. f. 3. Dredged off Carrickfergus Sept. 1835, Mr. Hyndman ; subsequently by Mr. H. and myself in Strangford lough.

[To be continued.]

IV.—*Nonnullorum Cerambycitum novorum, Novam Hollandiam et Insulam Van Diemen habitantium characteres.* By EDWARD NEWMAN, F.L.S., &c.†

GENUS. *SCELEOCANTHA*, Newman.

Prioni facies : prothorax utrinque spina recurva laterali armatus ; pone spinam excavatione semicirculari incisus, postice bisinuatus : tibiæ sulcatæ, carinatæ, extus spinosæ.

* *Pholas papyraceus*, Solander. Turt. Brit. Biv. Mr. Harvey has shown me a specimen which he found in 1826 in a fishing-boat in Dublin Bay ; but as Torbay boats occasionally visit this place, and in one of them it may possibly have occurred, the species cannot be announced as Irish.

† At the particular request of Mr. Davis, now settled at Adelaide, in South Australia, I have written characters for some of the fine Coleoptera which he has sent to this country : that portion of the list containing the Longicorns being ready, I have added a few more descriptions from specimens in the collection of Mr. Children, to which he has most obligingly allowed

Sp. 1. *S. glabricollis*. Piceus, prothorax glaberrimus: elytra profunde puncta, punctis humeralibus rarioribus, discoidalibus majoribus, apicalibus crebrioribus. Corp. long. 1·5 unc., lat. ·66 unc.

Exemp. unic. in Mus. D. Children.

Habitat. Insula Van Diemen.

Sp. 2. *S. pilosicollis*.

Prionus pilosicollis, *Hope, Trans. Ent. Soc.* tom. i. p. 16.

Exemp. unic. in Mus. Soc. Ent.

"Habitat. Nova Hollandia apud Swan River."

Genus. TOXEUTES, *Newman*.

Mallodonis fere facies: prothorax utrinque spinis recurvis, lateralibus, acutissimis armatus; spina antica ad marginem anticum sita, valde arcuata; spina 2^{da} mediana minus arcuata: tibiæ inermes.

Sp. 1. *T. arcuatus*.

Prionus arcuatus, *Fabricius, Syst. Eleu.* tom. ii. p. 259.

Exemp. In Mus. Brit., &c.

Habitat. Insula Van Diemen.

Genus. MALLODON, *Serville*.

Sp. *M. stigmatum*. Piceum: prothorax parallelipipedus, marginibus lateralibus crenatis, angulis posticis acutis, disco minutissime puncto, obscuro, spatiis 2 glabris fere trigonis exceptis: elytra rugosa: abdominis segmenta stigmatibus magno utrinque impressa. Corp. long. 1·5 unc., lat. ·6 unc.

Exemp. unic. in Mus. D. Children.

Habitat. Nova Hollandia.

Genus. DORX, *Newman*.

Dorci facies: caput porrectum, medio longitudinaliter sulcatum, mandibulæ validæ, extus et intus arcuatæ, apice bidentatæ, intus inermes: labi- et maxipalpi elongati, longitudine fere æquales, articulo apicali incrassato; antennæ corporis dimidio longiores, 11-articulatæ, articulus 2^{us} brevissimus, ceteri subæquales, compressæ oculos haud attingentes: prothorax longitudine paullo latior; margo anticus postico latior; margines laterales paullo sinuatæ; elytra linearia, prothorace paullo angustiora, disco convexo, apice rotundata: tibiæ angulares, pedetentim incrassatæ, apice spinis 2 acutis, halteribus 2 obtusis armatæ: tarsi manifesto 5-articulati: articulus 4^{us} brevis at satis notabilis.

me free access, and from some others in the British Museum. These hasty notes will, I trust, not merely serve to secure me priority in nomenclature, but will, on account of the extreme singularity of some of the forms described, afford considerable interest to our scientific entomologists.

Sp. *Doræ pentamera*. Nigra : elytris punctis, spina apicali suturali brevissima armatis : pedes picei. Corp. long. 1·4 unc., lat. ·5 unc.

Exemp. unic. in Mus. D. Children.

Habitat. Nova Hollandia.

Genus. PITHANOTES, *Newman*.

Prioni facies : Caput porrectum : mandibulæ validæ, extus arcuatæ, intus dentibus duobus minutis armatis, apice acutissimæ : labi- et maxipalpi breves articulo apicali cylindrico : antennæ corporis dimidio longiores, 11-articulatæ, articulus 2^{us} brevis, 3^{us} 4^{um} cum 5^o longitudine æquans : prothorax brevis, angulis rectangulis, utrinque spina acuta mediana laterali armatus : tibiæ fere *præcedentis*.

Sp. *Pith. falsus*. Niger : prothorax tuberibus nonnullis, quarum 4 seriem transversam constituunt, armatus : elytra ad humeros verrucosa, apicibus rotundatis, spina nulla suturali armata. (Corp. long. 1·25 unc., lat. ·55 unc.

Exemp. unic. in Mus. D. Children.

Habitat. Nova Hollandia.

Genus. BRACHYTRIA, *Newman*.

Caput in prothorace receptum : oculi fere reniformes : mandibulæ et palpi brevissima : antennæ dimidio corporis longiores, 11-articulatæ ; articulus 1^{us} latitudine duplo longior, curvatus ; 2^{us} 3^{us} et 4^{us} brevissimi ; cæteri longitudine subæquales, vix elongati : prothorax capite latior, subglobosus, angulis posticis late excavatus : scutellum elongatum, apice rotundatum : elytra prothorace latiora, fere parallela, dorso complanata, apice rotundata, inermia : pedes breves, femoribus pedetentim tumentibus.

Sp. *B. gulosa*. Fusca ; facie, gula, capitis parte postica, prosterni parte antica croceis : elytrorum margo costalis, macula mediana albida signatus : caput rugose punctatum : prothorax rugosus punctis magnis confluentibus impressus : elytra 3-carinata, utriusque carinæ duæ distinctæ fere ad apicem desinientes, 3^{ua} subsuturalis indistincta longe ante apicem desinens. Corp. long. ·7 unc., lat. ·175 unc.

Exemp. 1. in Mus. Brit. ex dono Rev. Augusti Beaufort.

Habitat. Insula Van Diemen.

Genus. NECYDALIS, *Linnaeus*.

Caput exsertum : antennarum articulus 4^{us} sequentibus manifesto brevior : femora apice pedetentim tumida, metatarsi manifesto dilatati.

Sp. *N. auricomus*. Niger ; capite croceo, antennis oculisque nigris ; prothorax nigerrimus, opacus : elytra semipellucida, pallida, apicibus ni-

gricantibus : pectus et abdomen lanugine aurea vestita. (Corp. long. .4 unc., lat. .075 unc.)

Exemp. 1. in Mus. D. Turner.

Habitat. Nova Hollandia. "Exemp. unic. prope Adelaide lectum tantum vidi." A. H. Davis.

Genus. *HESTHESIS*, Newman.

Caput pronum, in prothorace ad oculos reconditum : antennæ *maris* corpore longiores 12-articulatæ, *feminae* corpore breviores 11-articulatæ apice paullo crassiores, articulus 4^{us} 5^o et sequentibus vix brevior : prothorax valde convexus capite manifesto latior vix longior lateribus medio vix productis : elytra abbreviata, quadrata : corpus obesum lanuginosum : pedes compressi, femoribus vix tumidis ; protarsi paullo dilatati meso- et metatarsi nullomodo dilatati.

Sp. 1. *H. variegatus*.

Molorchus variegatus, *Fab. Syst. Eleu.* tom. ii. p. 375.

Exemp. in Mus. Ent. Club.

Habitat. Nova Hollandia.

Sp. 2. *H. ferrugineus*.

Molorchus ferrugineus, MacLeay — ? *Boisduval, Faune de l'Océanie*, p. 487.

Exemp. in Mus. Ent. Club.

Habitat. Nova Hollandia.

Sp. 3. *H. cingulatus*.

Molorchus cingulatus, *Kirby, Trans. Linn. Soc.* vol. xii. p. 470.

Exemp. in Mus. Ent. Club.

Habitat. Nova Hollandia.

Sp. 4. *H. bizonatus*. Abdominis zonulæ 2 ; prothoracis margo anticus tenue flavus ; antennæ basi graciles ferrugineæ ; apice crassiores fuscae : pedes ferruginei, femoribus apice nigris profemora fere tota nigra. Corp. long. .7 unc., lat. .175.

Exemp. 1. in Mus. Soc. Zool. Lon.

Habitat. Nova Hollandia.

Genus. *HELIOMANES*, Newman.

Caput pronum vix exsertum ; antennarum gracilium articulus 4^{us} sequentibus haud manifesto brevior ; elytra oblonga apice rotundata : corpus gracile : femora apice repente et manifesto tumida ; tarsi mediocres simplices.

Sp. 1. *H. Sidus*. Fuscus ; antennæ corpore breviores : prothorax elongatus medio longitudinaliter impressus, utrinque pone medium dente laterali armatus : elytra extus curvata, fusca, fasciis albidis undulatis duobus. (Corp. long. .3 unc., lat. .075 unc.)

In Mus. D. Children et D. Hope.

Habitat. Nova Hollandia.

Genus. *CALLIDIUM*, *Fabricius*.

Sp. *C. Faber*. Fuscum, nitidum: elytra puncta, utriusque discus macula magna testacea signatus: femora pallida, tumida: tibiæ tarsique suturatiores. Corp. long. .325 unc., lat. .1 unc.

Exemp. 2. in Mus. D. Turner.

Habitat. Nova Hollandia. "Exemp. 2, prope Adelaide lecta." A. H. Davis.

Genus. *COPTOMMA*, *Newman*.

Caput in prothorace fere ad oculos reconditum, porrectum, prothorace angustius; oculi arcuati, medio ad antennarum basin profunde emarginati, fere divisi: antennæ glabræ, *maris* valde, *femina* vix corpore longiores, 11-articulatæ, articuli e quarto compressi: elytra basi prothorace latiora apice angustiora, rotundata, inermia, *femina* haud abdomen tegentia: femora pedetentim tumida inermia.

Sp. 1. *C. virgatum*. Atrum, fulgore chalybeo nitens: antennarum apicibus albidis: caput albido 4 lineatum; lineæ 2 verticis inter antennas desinunt, 2 laterales oculos secant et in faciem adjunguntur: prothorax albido 4 lineatus, lineæ lineis capitis continuæ: elytrorum lanugo lutea maculam basalem obliquam, alteram medianam transversam, multasque minores irroratas format: metafemora macula mediana albida signata. (Corp. long. .8 unc., lat. .3 unc.)

Exemp. 2. in Mus. D. Children.

Habitat. Nova Hollandia.

Sp. 2. *C. textorium*. Testaceum, fulgore chalybeo nitens; lineis 2 capiti, prothoraci, elytrisque communibus albidis: lineæ elytrorum medio longitudinaliter hiantes. (Corp. long. .6 unc., lat. .2 unc.)

Exemp. 1. in Mus. D. Children.

Habitat. Nova Hollandia.

Genus. *ISCHNOTES*, *Newman*.

Caput pronum in prothorace ad oculos reconditum; oculi magni, sphæroides, vix emarginati; antennæ prothorace duplo longiores, filiformes, 11-articulatæ; articulus 1^{us} tumidus, 2 minimus, sequentes graciles elongati: prothorax absolute cylindraceus, capite quintuplo longior, ad marginem posticum pedes brevissimos ferens: elytra linearia, prothorace vix latiora at manifesto longiora, apice rotundata inermia: pedes simplices.

Sp. *I. cylindraceus*. Nigra, opaca: inter oculos linea longitudinalis vix elevata: prothorax subtilissime punctus, sed ad marginem posticum serie transversali punctorum profundorum impressus: elytra profunde puncta: pedes brevissimi. (Corp. long. .525 unc., lat. .05 unc.)

Exemp. 1. in Mus. D. Turner.

Habitat. Nova Hollandia. "Exemp. 1. prope Adelaide lectum." A. H. Davis.

Genus. *XYSTROCERA*, Serville.

Sp. *X. virescens*. Fusca, splendore virescenti læta: prothorax et elytra puncta, punctis plus minusve confluentibus: elytra 3-lineata, lineis haud prominentibus, apice rotundata. (Corp. long. 1.2 unc., lat. .3 unc.)

Exemp. 1. in Mus. Brit. D. Hardwicke legato.

Habitat. Nova Hollandia.

Genus. *PHORACANTHA*, Newman.

Hujus generis species sub genere "*Stenocorus*" celeberrimi Geoffroyi collocant MacLeay, Hope et Boisduval: autem *Stenocorus* cum genere "*Rhagium*" distincte est synonymus, *scilicet* Sp. 1. *St.* bifasciatus *Rhagium* bifasciatum certe est: iterumque Sp. 2. *St.* Inquisitor *Rha.* Inquisitor sine dubio. Audinet Serville (nisi sub nomine "*Mallocera*" insectorum Americæ Meridionalis genus) species haud collocat. Generis typus *Cerambyx* semipunctatus Donovan. Antennarum articuli plus minusve apice-1 spinosi: prothorax utrinque medio 1-spinosus, spina plus minusve prominens: elytra apice truncata plus minusve bispinosa: descriptionem fusiorem haud requirat genus percognitum. Novam Hollandiam species omnes incolant.

Sp. 1. *P. Synonyma*.

Stenocorus punctatus. Kirby 'Transactions of the Linnæan Society,' xii. 471. "Antennæ breviores rufo-piceæ articulis 5 intermediis, extus apice spina armatus, &c."

Sp. 2. *P. tricuspis*, ined.*Sp. 3. *P. quinaris*, ined.Sp. 4. *P. punctata*.

Stenocorus punctatus, Donovan,
'Epitome of the Insects of New
Holland.'

Sp. 5. *P. obscura*.

Stenocorus obscurus, Donovan, Id.

Sp. 6. *P. semipunctata*.

Stenocorus semipunctatus, Oliv. 69,
tab. ii. fig. 19.

Stenocorus semipunctatus, Fab.
Syst. Eleu. ii. 306.

Stenocorus semipunctatus, Donovan, Epitome, &c.

Sp. 7. *P. curvispina*, ined.Sp. 8. *P. rubripes*.

Stenochorus rubripes, Boisduval,
'Faune de l'Océanie,' p. 477.

Sp. 9. *P. dorsalis*.

Stenochorus dorsalis, MacLeay,
'Appendix to King's Voyage,'
ii, 451.

Sp. 10. *P. aberrans*, ined.Sp. 11. *P. ventralis*, ined.Sp. 12. *P. biguttata*.

Stenocorus biguttatus, Donovan.
—— tessellatus, Latreille.

Sp. 13. *P. senio*, ined.

* I was on my way to the printers, with the MS. of these notes in my pocket, when accidentally meeting Mr. Westwood, I learned that the Rev. F. W. Hope was about to publish figures and descriptions of several new species of this genus: I have therefore withdrawn the descriptions I had written, lest my new species should clash with Mr. Hope's.

Genus. DIDYMOCANTHA, Newman.

Caput exsertum, vix pronum; oculi magni, reniformes, antennis fere amplectentes; antennæ corpore manifesto longiores 11-articulatæ; articulus 1^{us} paullo tumidus, 2^{us} minutissimus; 3^{us}, 4^{to} paullo longior, 5^{us}, 3^{tio} vel 4^{to} paullo longior, cæteri ad apicem præcedentibus longiores, compressi; prothorax capite longior et angustior, lateribus spinis, 2^{us} armatis et inter spinas dente obtuso instructis: elytra prothorace latiora parallela apice rotundata inermia: femora pedetentim vix tumescentia.

Sp. *D. obliqua*. Antennarum articuli 1^{us} et 2^{us} nigri, 3^{us} 4^{us} et 5^{us} lutei apice nigri, cæteri fusci: scutellum albidum: elytra sordide testacea fasciis binis abnormibus nigris. Corp. long. .525 unc., lat. .175 unc.

Exemp. 1. in Mus. D. Children.

Habitat. Nova Hollandia.

Genus. PHLYCTENODES, Newman.

Caput exsertum, vix pronum; maxilpalpi mandibulis valde longiores; antennæ 11-articulatæ, articulus 1^{us} paullo tumidus, 2^{us} subglobosus; cæteri longitudine fere æquales, ultimo breviori: prothorax dorso 4-spinosus, spinis 2 anticis acutis paullo retrorsum curvatis; 2 posticis vix acutis nullo modo curvatis; lateribus 1-spinosus; spina mediana, acuta retrorsum curvata: elytra parallela prothorace latiora, apice obtusa inermia: femora pedetentim tumida.

Sp. *P. pustulosa*. Fusco-niger concolor; caput, prothorax et elytra pustulis—basi majoribus apice minutissimis—crebre tecta. (Corp. long. 1.2 unc., lat. .3 unc.)

Exemp. 1. in Mus. D. Children.

Habitat. Nova Hollandia.

Genus. TESSAROMMA, Newman.

Caput exsertum, porrectum; antennæ graciles, corpore vix breviores, 11-articulatæ; articulus 1^{us} pyriformis, basi constrictus, apice tumidus; 2^{us} brevis obconicus; ceteri fere lineares; 3^{us} 2^{do} paullo longior, 5^{us} et sequentes 3^{tio} paullo longiores: oculi 4, anteriores majores: prothorax capite angustior elongatus, dorso gibber spinis 2, lateribus spina mediana armatus: elytra prothorace quadruplo longiora vix duplo latiora, parallela apice extremo oblique abscissa, femora apice repente tumescentia.

Sp. *T. undatum*. Testaceum, fusco variegatum lanugine serica splendidum; antennæ et pedes testacea: femora et tibiæ fusco cincta (Corp. long. .8 unc., lat. .15 unc.)

Exemp. unic. in Mus. D. Turner.

Habitat. Nova Hollandia. " Exemp. unic. prope Adelaide, sub cortice,

mense Junio lectum; vivens formosissimus coloreque fulgoreque.”
A. H. Davis.

Genus. RHAGIOMORPHA, Newman.

Caput exsertum porrectum; antennæ filiformes longitudine corpus æquantes, 11-articulatæ; articulus 1^{us} elongatus, arcuatus, apice tumidus; 2^{us} minutus; cæteri graciles, longitudine fere æquales: prothorax capite haud latior dorso tuberis 4 fere confluentibus instructus, lateribus medio gibberis in spinam obtusam productis: elytra prothorace latiora linearia apicibus rotundatis: femora manifesto ac pedetentim tumida.

* Species normales.

Sp. 1. *R. Lepturoides*.

Stenocortus Lepturoides, Boisduval, Faune de l'Océanie, p. 479.

Exemp. in Mus. D. Gory, Dupont, et Buquet.

Habitat. Nova Hollandia. Apud Port Jackson lectum.

Sp. 2. *R. concolor*.

Stenoderus concolor, MacLeay. Appendix to King's Voyage, vol. ii. p. 451.

Exemp. unic. in Mus. D. Children. Descriptio vix distincta.

Habitat. Nova Hollandia.

Sp. 3. *R. sordida*. Fusca, lunagine argenteo sparsim vestita; caput inter antenuas excavatum, punctum: prothoracis dorsum longitudinaliter impressum: singuli elytri lineæ vix elevatæ 3: femora basi pallidiora. (Corp. long. .5 unc. lat. .1 unc.) antennæ desunt.

Exemp. unic. in Mus. D. Turner.

Habitat. Nova Hollandia. “Exemp. 1. prope Adelaide lectum.” A. H. Davis.

** Species aberrantes.

Sp. 4. *R. oculifera*. Caput exsertum linea longitudinali impressum; antennarum articuli 1 et 2 nigri; 3^{us} hirsutiae exteriori rufa ornatus; 4^{us} et sequentes picei: prothorax lateribus lanugine aurea vestitus: elytra quasi reticulata, 4 carinata, carina prima macula rotunda lanuginosa aurea interrupta est et ante apicem desinet; 2^{us} 1^o longior fere ad apicem desinens; inter 1^{um} et 2^{um} linea aurea, lanuginosa, basalis apparet; 3^{us} ad humerum oritur et longe ante præcedentes desinet; 4^{us} infra humerum oritur et ante apicem 2^o conjungitur: mesosternum utrinque linea lanuginosa argentea signatum. (Corp. long. .7 unc. lat. .1 unc.)

Exemp. 2. in Mus. Brit.

Habitat. Nova Hollandia.

Genus. STENODERUS, Dejean.

Sp. *grammicus*. Pallide ferrugineus: oculi nigri: prothoracis latera fusca: singuli elytri margo suturalis lineæque tres elevatæ albida, linea prima ad marginem suturalem, secunda ad lateralem, in medio tendit. Corp. long. .425 unc., lat. .075 unc.

Exemp. 3. in Mus. D. Turner.

Habitat. Nova Hollandia. “Exemp. 3, prope Adelaide lectum.” A. H. Davis.

V.—*Description of Limneus involutus, Harvey, MS.* By W. THOMPSON, Vice-President of the Natural History Society of Belfast;—*with an account of the Anatomy of the Animal.* By JOHN GOODSIR, Esq.

[With a Plate.]

Limneus involutus,
Amphipeplea involuta, } Harvey, MS.

SPEC. CHAR. Spire sunk within the outer whorl; aperture very large, extending to the apex.

The finest specimen I have examined is $5\frac{1}{2}$ lines in length, and $3\frac{1}{2}$ in breadth; volutions four, the largest enveloping the other three, of which none are visible in the profile of the shell; aperture very large, wide at the base (exposing the columella throughout its entire length) and extending to the apex of the shell, margin reflected only where it joins the pillar. Shell polished, of a pale amber colour, extremely thin, with coarse longitudinal striæ.

This species approaches the *L. glutinosus* more nearly than any other native *Limneus*, but from the circumstance of the aperture extending to the apex, has at a cursory view as great a resemblance to the *Bulla Akeræ*, Mont., as to any other British shell; a coincidence which is rendered still more remarkable by the columella presenting the same appearance in the *L. involutus* as it does in that species.

The discovery of this new and beautiful mollusk is due to my friend Wm. H. Harvey, Esq. (well known for his botanical investigations) who obtained a few specimens in a small alpine lake on Cromaylaun mountain, near the celebrated lakes of Killarney, in the month of April 1832.

The above account was read to the Linnæan Society of London in April 1834. To the present time (Sept. 1839), I have not heard of the occurrence of the species in any other locality in Ireland. The original station was visited by Mr. R. Ball and myself in June 1834, when we procured only a few small specimens. The time was however unfavourable for seeing these mollusks to any advantage, being at a very early hour in the morning, before the warmth of the sun had tempted them to leave the bottom of the lake or adjoining rivulet.

This shell, from partaking more of the form of the marine

genus *Bulla* than of the other *Limnei*, seemed so highly interesting, that I conceived that the mere description of it would be of comparatively little value without that of the animal. Its dissection was most kindly undertaken by Mr. Goodsir, to whom I am indebted for the following description, and the admirable drawing which illustrates it.

“In structure the *Limnæus involutus* resembles the other species of the genus. When its organs are compared with those of the *L. stagnalis* as described and figured by Cuvier, they are found, with the exception of the nervous collar, and the reproductive organs, to be nearly identical in arrangement and structure (Plate I. fig. 2.).

“In his memoir on the *Limnæus* and *Planorbis*, Cuvier describes the supra-œsophageal portion of the nervous collar as consisting on each side of three small globules, connected mesially by a narrow portion; of an infra-œsophageal ganglion composed of three masses, and of a small ganglion at the junction of the buccal apparatus and gullet. In the *L. involutus* the nervous collar presents the following arrangement (fig. 3.). On each side of the gullet and buccal mass, there are two fusiform ganglia (*a a*), connected superiorly by a straight narrow commissure (*b*), and inferiorly by four small lateral (*c c c c*) and two large median ganglia (*d d*). Anterior to these and concealed by the buccal mass are two large ganglia (*e e*), connected mesially to one another, and laterally to the middle of the lateral ganglia (*a a*), having no connexion with the six posterior ganglia. The masses (*a a*) give off near their anterior extremities two nerves, which run forward along the inferior surface of the buccal apparatus, and terminate in two small ganglia (*f f*), which are connected by a filament, and distribute nerves to the buccal mass and œsophagus. The lateral ganglia therefore have one superior commissure, consisting of a simple cord, and two inferior commissures, the posterior containing six ganglia, the anterior two. The lateral and the six posterior ganglia give off all the nerves described by Cuvier; the two anterior connecting masses supply the muscular bundles in their neighbourhood.

“The arrangement of ganglia described above is not peculiar

to this species, as it exists also in the *L. Pereger*; and one similar but more complex has been described and figured in the 'Annales des Sciences Naturelles' for 1837, page 112, by Vanbeneden as existing in the *L. glutinosus*. Vanbeneden describes a median between the two large anterior ganglia, and another between the two small stomato-gastric ganglia.

"Cuvier in his memoirs on the *Limnæus* and on the other gasteropod mollusks, mistook the testicle for the ovary, and consequently reversed certain of the other reproductive organs. Prevost of Geneva, in a paper published in the Transactions of the Physical and Natural History Society of that place for 1828, and in another contained in the 'Annales des Sciences Naturelles' for 1833, pointed out this error, and described the very beautiful structure, by means of which the seminal fluid is conveyed along the cavity containing the eggs, without coming in contact with them. This structure may be distinctly seen in the *Helix aspersa*, in which it consists of a groove, with the orifice of the duct at both extremities, running along the inner surface of the oviduct. When the fluid is passing from the testicle this groove is converted into a temporary tube by the close apposition of its lips; a structure similar to the groove in the true ruminating stomach. The arrangement of the reproductive organs in *L. involutus*, although different from that described by Cuvier in the *L. stagnalis*, is yet similar to that given by Prevost. The testicle, *a*, fig. 2. which is situated in the extreme whorls of the shell, sends off a duct, which has attached to it in the middle of its course, small follicles (*b*) of the same diameter as itself, which appear, if carelessly examined, like duplications of the tube. The duct then becomes closely connected with the point of junction of the ovary and oviduct, runs along the latter for a short distance, and opens into the acute extremity of an oblong sac (*c*), which is closely but not intimately adherent to the oviduct. This sac appears granular from the follicular arrangement of its inner surface; it is bulbous at its anterior extremity, near which it sends off the second division of the seminal duct (*d*), which running along the terminal extremity of the oviduct, at length leaves it, and dives under the transverse muscles (*e*) of the foot, as described by Cuvier in *L. stagnalis*, again

appears near the root of the male organ (*f*), where it is coiled up, and before terminating in the penis presents a small dilatation.

“The female organs are an ovary (*g*) which lies across the middle of the body; and an oviduct (*h*) which is dilated and sacculated transversely along its middle third. The vesicle (*i*) found in this situation in the gasteropod mollusks opens by a short neck at the termination of the oviduct.

“JOHN GOODSIR.”

VI.—On certain Characters in the *Crania and Dentition of Carnivora* which may serve to distinguish the subdivisions of that Order. By G. R. WATERHOUSE, Esq.*

JUDGING from the form of the skull and lower jaw, and from the structure of the teeth, the order *Carnivora* appears to consist of six families, of which the Dog, Viverra, Cat, Weasel, Bear, and Seal afford familiar examples; of these the Cats and Weasels appear to be the most truly carnivorous, and the Bears the least so.

To these six families Mr. Waterhouse applies the names *Canidæ*, *Viverridæ*, *Felidæ*, *Mustelidæ*, *Ursidæ*, and *Phocidæ*.

In the first of these families (the *Canidæ*) the muzzle is elongated; the bony palate terminates in a line with the hinder margin of the posterior molars, or even in advance of that line, and in this respect differs from other *Carnivora*; the posterior portion of the skull is short, and there are two true molars on either side, both of the upper and lower jaw.

The principal genera contained in this family are *Canis*, *Fennecus*, *Lycaon*, and *Megalotis*. In the form of the lower jaw, and in dentition, the last-mentioned genus affords a most remarkable exception to the other *Carnivora*, and the palate terminates behind the line of the posterior molars; there may be some doubt therefore as to its real situation.

The *Viverridæ* have the same general form of skull as the *Canidæ*, but differ in having the posterior portion more produced; the bony palate is carried further back, and the small back molar observable in the lower jaw of the Dogs is here wanting; they have, therefore, but one true molar on either side of the lower jaw, and two true molars on each side of the upper jaw.

To this family belong the genera *Paradoxurus*, *Cynogale* (which

* Communicated to the Zoological Society, Sept. 24, 1839.

is the *Potamophilus* of Müller and *Limictis* of De Blainville), *Amblidon*, *Hemigaleus*, *Herpestes*, *Cynictis*, *Ryzæna*, *Crossarchus* (the three last being divisions or subgenera of *Herpestes*, in which there is a complete bony orbit), *Viverra*, *Genetta*, *Prionodon*, and *Cryptoprocta*.

The Hyæna, Mr. Waterhouse is inclined to regard as an aberrant form of the *Viverridæ*: in the general characters of the cranium, and especially in the curved form of the lower jaw, it differs considerably from the Cats (with which it has by some been associated), and approaches the *Viverras*. If, however, it be placed with the *Viverridæ*, it will form an exception, as regards its dentition, having but one true molar on either side of the upper jaw. The 'carnassière' has a large inner lobe, and in this respect also resembles the *Viverras*, and not the Cats.

The species of the family *Felidæ* may at once be distinguished by the short rounded form of the skull, combined with the straightness of the lower margin of the ramus of the lower jaw, and the reduced number of the teeth, especially of the true molars, of which there are none in the lower jaw, and but one in the upper, and that very small.

This family contains the genus *Felis*, species of which are found in all quarters of the globe, Australia excepted. The Cats appear to bear the same relation to the *Mustelidæ* as the Dogs to the *Viverridæ*.

The *Mustelidæ*, like the *Felidæ*, have the muzzle short and obtuse; the skull, however, is more elongated. They may be distinguished by there being one true molar on either side of each jaw; that in the upper jaw is well-developed, and generally transverse; but in some, such as the Badger, it is longer than broad: in the Otters, Skunks, and American Badger (*Taxidia Labradorica*), the true molar is intermediate in form between the common Badger (*Meles vulgaris*) and the more typical *Mustelidæ*. The false molars in the Weasels (*Mustela*) are typically $\frac{3-3}{4-4}$, but in some species they are reduced to $\frac{1-1}{3-3}$. As in the *Felidæ*, the angle of the lower jaw, in the greater portion of the *Mustelidæ*, is on the same plane as the lower edge of the horizontal ramus: in other *Carnivora* it is raised. In this family there is a great tendency in the glenoid cavity of the temporal bone to inclose the condyle of the lower jaw. The condyle is more truly cylindrical, and longer than in other *Carnivora*. In the Dogs there is no trace of the anterior descending process of the temporal bone, which in the *Mustelas* confines the condyle of the lower jaw;

in other *Carnivora* there is always a slight trace of this process, but in none does it inclose the condyles, as in most of the *Mustelidæ*.

The genera contained in this family are *Mustela*, *Zorilla*, *Galictis*, Bell (which must not be confounded with the *Galictis* of Is. Geoffroy St. Hilaire, published in the 'Comptes Rendus' for October 1837, p. 581.), *Mellivora*, *Ursitaxus*, *Helictis* and *Gulo*, in which the true molar of the upper jaw is transverse; *Lutra* and *Mephitis*, in which this tooth approaches more or less to a square form; *Taxidea*, in which it is triangular; and lastly, *Meles*, *Arctonyx* and *Mydaus*, in which the true molar is longer than broad. This last-mentioned genus evinces an approach to the order *Insectivora*.

In the *Ursidæ* there are two well-developed true molars on either side of each jaw: the 'carnassière' here has changed its function, not being suited, as in other *Carnivora*, to cutting flesh. The palate is considerably elongated. In the Bears (*Ursus* and its subgenera) it is small, being robbed as it were of its nutriment by the true molars, which are very large. In the other *Ursidæ* (*Procyon*, *Nasua*, *Cercoleptes*, *Arctictis* and *Ailurus*,) the 'carnassière,' especially that of the upper jaw, and the true molars, are nearly equal in size, and also nearly resemble each other in other respects*.

In the true Bears the form of the lower jaw differs from that of any of the preceding *Carnivora* in having a projecting process on the under side of the ramus, and situated a little in advance of the angle of the jaw. The same character is also found in many Seals (*Phocidæ*), which in several other respects appear to approach the Bears.

VII.—*Summary Description of Four new Species of Otter.* By B. H. HODGSON, Esq., Resident at Catmandu, Nepal†.

ONE of the most remarkable features of the mammalogy of Nepal is the great number of distinct species of *Otter* characterizing it. There are at least seven species, I believe, though not one of them is numerous in individuals, at least not in comparison of the common Otter of commerce, which is produced in the neighbourhood of Dacca and Sylhet. This rarity of species, added to the circumstance of the animals not being regularly hunted for their skins, renders it very difficult to procure live specimens; and without live specimens

* "From an examination of the external characters of *Bassaris astula*, it appears to me that it belongs to this group."

† From the Asiatic Journal, No. 88, p. 319.

—which may be slain and their osteological as well as other characters thus accurately examined—the discrimination of specific differences is a work of extreme labour and delay. Many years ago I announced to Mr. Bennett, the late Secretary of the London Zoological Society, the fact that there are several species of *Lutra* in Nepal, and before he died he was nearly convinced of the correctness of the statement, though I could not then, nor can now, give a full exposition of even those with which I am best acquainted.

Waiting, however, for the perfect knowledge when the materials of it are not under command, is, I find, like waiting on the river's side for a dry passage after the waters have flowed past; and I shall therefore offer no apology for briefly characterizing those four of the seven Nepalese species of Otter of which I have considerable certainty, leaving the remaining three to some future occasion.

GENUS LUTRA.

1st Species—*TARAYENSIS* NOBIS.

Size, medial. *Structure*, typical. Skull and head much depressed. Lower incisors ranged nearly in line. Tail equal to two-thirds the length of the animal, and much depressed. Form robust. Nails compressed, exerted from the finger ends, and acute. Fur short and smooth. *Colour*—above, clear umber; below, and the hands and feet, pure yellowish white; the yellow tint deepest on the limbs; the pale colour on the head and neck extending upwards to the line of the ears—less so on the body; and the distinction of dark and pale hues very decidedly marked. Tail above and below, dark.

2nd Species—*MONTICOLUS* NOBIS.

Size, large. *Structure*, upon the whole similar to the above. Tail equal to more than two-thirds of the animal, and less depressed. Skull and head less depressed. Intermediate incisors of lower jaw ranged entirely within or behind the line of the rest. *Colour*—above, deeper than the above, or bistre brown; below, sordid hoary, vaguely defined, except on the edge of the lips and chin; limbs nearly as dark as the body. Fur longer and rough, or porrect from the skin in a considerable degree.

3rd Species—*INDIGITATUS* NOBIS.

General form and proportions of *Leptonyx*, to which it is affined. Habit of body more vermiform than in the above. Tail but half the length of the animal. Toes very short, and more than half buried in the palmary mass. Nails short and worn, but not depressed nor

truncated, as in *Leptonyx*. Size, medial. Colour—same as in the last, but deeper still, or dusky bistre; paler and ruddier on the body below, and albescent on the head below; but the colours not well defined, and only really distinct (except in shade) on the inferior surface of the head. Character of the fur as in the last, and indeed in all the mountain species.

4th Species—AURO-BRUNNEUS NOBIS.

Size, small. Habit of body still more vermiform. Tail less than two-thirds of the length of the body. Toes and nails fully developed. Fur longish and rough, as before. Colour—rich chestnut brown (the fruit) above; and golden red below and on the extremities.

Remarks.—The three last species are confined to the mountains, as is the first species to the plains at their foot. The dimensions in inches, and the weight of the four species are as follow:—

	1	2	3	4
Tip of snout to } base of tail . }	26 to 28	30 to 32	22 to 24	20 to 22
Tail	16	20	10½	12 to 13
Weight	16 to 20 lbs.	20 to 24	11 to 13	9 to 11

I am, Sir,

Your obedient servant,

B. H. HODGSON.

Nepal, May, 1839.

VIII.—Information respecting Botanical Travellers.

Mr. Schomburgk's recent Expedition in Guiana.

[Continued from p. 434 of vol. iv.]

THE Yamanack of the Creoles, or Wawula of the Arawaaks, may be considered the representative of the Madagascarian *Lemur* in Guiana. It is the *Potos caudivolvulus* of Desm., or *Cercoleptes caudivolvulus* of Illiger. Its general appearance is so much like a *Lemur* that it has been classed under that family. In its sanguinary disposition, its teeth, and feet, it resembles the feline race, from which it differs however in its slightly prehensile tail, which is considerably longer than the body. The hind legs are a little longer than the fore, and they walk altogether on the soles and palms. They carry their food with the fore paw to the mouth, and are expert climbers. Their prehensile tail is of great advantage in climbing trees when in search of honey, their fur and skin being apparently impervious to the sting of bees. They feed likewise upon young birds, eggs, and mice; they pass the day in hollow trees and

stir out only by night. The glare of the day appears painful to their eyes; those which in a tamed state are exposed to it, appear uncomfortable and slow in their movements, while in the dark they are all dexterity. I have seen several in a tamed state, which when awakened in the day seemed uncomfortable and rolled themselves up again to sleep. Its tongue is long; this organ is therefore admirably qualified for sucking honey. When tamed it appears partial to syrups or any other sweets, but indeed nothing comes amiss to it, and it feeds as well on meat, yams, &c. as on fish.

They are more common at the sea coast, but inhabit likewise the Savannahs. The Macusi Indians of the Savannahs call it Yawari, the Warraus at the sea-coast Uvari.

Those coppices of wood, which rise from amidst the Savannahs like verdant isles from the bosom of a lake, are the favourite abode of an animal, which, if we except its plantigrade feet, approaches in its habits and appearance our martens. It is the *Gulo* of authors.

We observed two species in Guiana, the larger of which may be identified with the *Gulo barbarus*. The size of the individual from which the following description is taken, was two feet from the tip of the nose to the insertion of the tail, the latter being eleven inches. The head was broad and compact, the ears short and round, the back arched, the tail low and bushy, the legs thick and strong, especially the fore feet, which were somewhat shorter than the hinder. The head is gray, the fur above deep brown tipped with white; all the rest of the body is of a deep shining black, with the exception of a large whitish-yellow spot on the breast, which contrasts strongly with the other colours. It possesses the peculiarity of being able to erect all the hair of its bushy tail at pleasure.

The whole appearance of these animals bespeaks strength, and their toes being armed with crooked nails, they have every requisite for indulging in their sanguinary habits. Their principal food are small animals, as mice, rats, birds, and insects, but they also feed on fruit and are partial to honey. As they are expert climbers, they plunder the nests of the wild bees, and like the Coati or *Nasua*, are able to run down a tree which grows perpendicular, head foremost. They feed by day, and generally betake themselves to a hollow tree for their night quarters. Here they likewise seek refuge when hunted. They are found more commonly on Savannahs than elsewhere, and only occasionally in the forest; they never seek their food near human habitations. They are sometimes tamed, and are then gentle and playful; but they are easily excited, and when preparing for defence or war they erect the hair of their tail. They

possess the skill of cats in spying out and destroying rats and mice, which from their long slender shape, they are able to follow better to their retreat than the former. Two glands which are situated near the anus contain a fluid which possesses a disagreeable odour. The animal is called by the Arawak Indians Hacca, by the Macusi MAIKANG.

The Grisons have been divided from the true Wolverines (*Gulo*), and Mr. Bell has formed the genus *Galictis*. Guiana possesses two species, namely *Galictis vittata* and *G. Allamandi* of Bell. The *Galictis vittata* or Petit Frurat of Azara, inhabits the mountainous districts where the Essequibo has its sources. I saw the first in a tame state at a Woyawai settlement in the Acarai mountains. It measured about 16 inches from the tip of the nose to the insertion of the tail, the latter being 6 inches long. Its colour is of a light-brown on the back, but near the head it is of a pale-gray colour, mixed with black; the muzzle, throat, chest, and body underneath are of a shining black.

The claws are strong and sharp, and the toes are half connected by a membrane. In its tamed state it lived on boiled fish, meat, fruits, yams, &c., but in the forests it subsists on birds, reptiles, and small game. It feeds during day, and selects the hollow of a tree for its abode during night.

The second species, *Galictis Allamandi*, Bell*, is equally scarce in Guiana; but it is occasionally met with near the sea coast in Demerara. It is somewhat larger than the *Galictis vittata*; its total length is about $2\frac{1}{2}$ to 3 feet, and although it exhibits the same general character, it differs widely in its colouring. The fur on its back is at the base of a deep black, and the points are white; the muzzle, lower jaw, throat, and part of the belly are of a shining black. A whitish line extends from between the eyes over the ears to the sides of the neck. In a state of nature it is said to be ferocious, and it is more difficult to tame it even when taken in a young state than the *Gulo barbarus*. I have been told of one which was kept on board of a colony schooner; this is however the only instance which came to my knowledge where it had been reconciled to a domesticated state.

The specimen which I possess in my collection appears to be the young of *Galictis Allamandi*; the hairs on its back are more of a silvery gray than in the adult, but there are no specific differences.

Both species are alike in their habits; and, aware of their inca-

* Vide Mr. T. Bell on the genus *Galictis*. Trans. Zool. Soc. vol. ii. Pt. 3, p. 201.

capacity to overtake their prey by swiftness, they resort to stratagem. When pressed by hunger they do not despise carrion. The *Gulo barbarus* and *Galictis vittata* which I have seen in a tame state, had the greatest aversion for water. I recollect the boys at the Woyawai settlement amused themselves with carrying the tame *Galictis vittata* to the banks of the brook; it availed itself of the first opportunity to escape, and if it had wet its feet, it used the same manœuvres as a cat to get rid of any moisture which might have remained on it. The *Gulo barbarus* is equally fearful of the water. If, therefore, naturalists have observed any resemblances between the Grison and the Otter, this does not refer to their habits. It may resemble the bear in its gait and semi-plantigrade feet, but there exists no further affinity; while at the first glance, its slender body, the shortness of its legs, the softness of its fur, its dentition and sanguinary habits, and not least, the strong odour, point to the typical *Mustelida* with regard to the position which the Grison ought to occupy.

Our tents were pitched on the 9th October, 1838, at the foot of a hillock, the summit of which was crowned by a remarkable natural column, known to the Macusi Indians under the name of Pourae Piapa, or the felled tree, from the resemblance which it bears to a trunk of a tree deprived of its leafy crown. While we were ascending the hill for a nearer inspection of this wonderful freak of nature, the Indians had set the Savannahs on fire. A general bustle of those who had remained in the camp attracted my attention. I saw the men armed with bows and arrows, and accompanied by their dogs under full cry in pursuit of some game. The chase was of short duration, and when reaching the spot where the pursuers had come to a stand, I found that an Armadillo of gigantic size, which no doubt had been chased by the flames from its retreat, had caused the commotion. It was lying there a round misshapen mass, its head partly buried under its armour, the feet drawn together, and its body pierced by numerous arrows. Ever and anon the barking dogs inflicted new wounds, or another iron-headed arrow was sent through its shell into the flesh of the poor animal, which offered not the slightest resistance to its tormenters; and I do not know how long they would have continued to inflict new tortures, if I had not desired them to end its sufferings by the heavy stroke of a club.

I continued my visit to the Pourae piapa with the intention of taking the dimensions of the Armadillo after my return to the camp; in this I was however disappointed; when I arrived there it was cut

up, and parts of it were already boiling in the pots of the Indians, not for the purpose of eating it, as the Macusi abhors the flesh of this species of Armadillo, but for the sake of extracting its fat or oily substance.

I estimated its weight from 110 to 120 lbs.*, its height about 3 feet, its length $5\frac{1}{2}$ feet. Its tail was about 14 to 16 inches in length, and its root nearly as thick as a man's thigh, tapering very abruptly. The fore foot had five toes, the middle one of which was $7\frac{1}{2}$ inches in length. These are the only details which I can offer of a species which in its size surpasses the largest giant Armadillo known (*Dasypus giganteus*, Desm.). As far as I recollect, the head was comparatively small; but as I intended to have it inspected more closely on my return, I have mentioned only such circumstances as have fixed themselves in my memory, and which I wrote down after my intentions were frustrated by the Indians. I cannot pretend to assert that it is a different species from *Dasypus giganteus*, but its enormous size will attract the attention of naturalists and geologists to the fossil genera, which if compared with the existing species will not offer so great a difference in size. The Macusi Indians in our train named it MAOURAIMA, the Wapisianas MARURA, the War-raus OKAIYÉ, the Arawaaks IASSI O HARA.

I possess from Mr. Vieth, the following note of a species which I do not doubt was the *Dasypus giganteus*. "I stuffed at Devonshire Castle Plantation in Demerara, an Armadillo which weighed 70lbs., but I did not take its dimensions; and eight years having since elapsed, the present description is entirely from memory. The shell may have been 2 feet to $2\frac{1}{2}$ feet long, and its total length about 5 feet, of which the tail was about 2 feet. The shell was very thick and hard, covered with scales of different shape. On the belly and those parts where it was without scales, were a few scattered hairs; the claws on the fore feet were very long and strong. The tail, which was covered with the same kind of coat of mail as the back, was about 3 inches in diameter, at the root gradually tapering to a point. The back and all those parts which had the scaly covering were of a horn colour; the under part, which was without scales, whitish. As it was killed by Negroes near the coast I could not procure the Indian name."

The third species in size is the *Dasypus encoubert*, Desm. with six or seven bands. It appears to be very common at the savannahs which extend between the rivers Berbice and Demerara.

* Two men were required to carry it when they took it to our halting place.

The fourth species with which I am acquainted is the *Dasypus Peba*, Desm. with from seven to nine bands. It is the most common in Guiana, and found as well at the coast region as in the interior. Its length is about 18 inches, and the tail is as much more. The head, back, and tail is covered with scaly armour like its congeners. The belly, under part of the head and throat, legs and thighs, are covered with a whitish skin, set with a few scattered hairs. The claws are strong, and these animals can dig with so much ease that there is little hope of taking them without great exertions by digging after them*. They bear eight or nine young at a time, which follow the mother like young pigs. The young are blind at their birth.

The principal feeding time is in the night, but they go sometimes abroad in the day. Their food consists generally of worms and insects. In a tame state they readily eat farinaceous food and also roots. They are called by the Arawaaks IASSI, which is the general name of the Armadillo.

The Savannah Armadillo is Desmarest's *Dasypus villosus*; and, as we were assured by the Indians, it inhabits only the plains, and is never to be met with in the forest. The Indians accuse it of feeding occasionally on carrion†. It is distinguished by its being more flat in shape than the others, and by the numerous hairs which cover as well the shell as the body.

Among my collection is a specimen of the *Dasypus tatouay* of Desmarest, which was procured at the coast regions at Demerara. Its claws, of which there are five on the fore feet, are very large in proportion. It has from 12 to 13 moveable bands; the tail is round, short, and covered with a few tubercles. Its ears are large and erect. The head resembles *D. Peba*.

The Iassi Baracatta of the Arawaaks is the smallest Armadillo in Guiana (*Dasypus minutus*, Desm.); its body is about 10 inches, and covered with numerous brown hairs. Its geographical distribution extends over the southern half of South America.

* Mr. Waterton, in his amusing Wanderings, p. 166, tells us "that the Indian, to prevent disappointment when discovering a hole where he supposes an Armadillo to have taken up its abode, carefully examines the mouth of the hole, and puts a short stick down it. Now if on introducing the stick a number of musquitos come out, the Indians know to a certainty that the Armadillo is in it; wherever there are no musquitos in the hole, there is no Armadillo."

† The Indians on the Rio Branco gave us the same information, and at their dances they sing to that effect, that when once dead their relations should only throw them on the savannahs, where the Armadillo would bury them.

I have enumerated seven species of Armadillos which I know to inhabit Guiana. They resemble each other in their habits and appearance; and their form, number of claws, and dentition give to the naturalist the specific difference. The number of bands of which their armour consists is so variable in different individuals of the same species, that the systematic naturalist should not attach the slightest value to it.

They all burrow, and their general food appears to be worms and insects; they sometimes commit depredations in the provision grounds, and the giant and savannah Armadillo are said to feed on carrion. All Indians agree in this assertion.

When about to bring forth, the mother is said to make a nest in the burrow, and gives birth to from seven to nine young, which are blind. They afterwards follow the mother, who, whilst the young ones are still helpless, never ventures to leave their hole by day. They feed generally by night, but from the circumstance that we have secured several in the daytime which we found walking, it may be concluded that hunger forces them sometimes to go in search of food during the day. Their walk is swift, but they can neither run, leap, nor climb. If pursued, therefore, without being able to reach their hole, they roll themselves more or less up, and submit to their fate without defence.

The smaller species are eaten by all the Indians and are considered a delicacy. The Arawaak Indians are the only tribe whom I have ascertained to eat the giant Armadillo. The *Dasypus Peba*, or common Armadillo, is even esteemed by many Creoles, and its flesh is white and tastes somewhat like rabbit; we may therefore suppose that they receive no mercy. As they are seldom found from their retreat, nor stir out except by night, the pursuit of them requires some skill and patience.

I myself have seen that when pursued and they are far from their retreat, they begin digging a fresh burrow, and when half buried and laid hold of by the tail, it is so difficult to pull them backwards that they often make their escape with the loss of their tail. Their pursuers, sensible of this, avoid dragging the tail with all their force, while another tickles it behind with a small stick, upon which they relinquish their hold and are secured.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

A History of British Ferns. By Edward Newman, F.L.S. London, Van Voorst. 8vo.

WE rejoice to find that Mr. Van Voorst is not confining the valuable series of Natural History works which is issuing from his establishment to zoology, and beg to congratulate him upon the beauty of the first botanical portion of the collection.

The ferns have long attracted the attention not only of botanists but of all admirers of nature by their great elegance, and indeed we know of nothing more worthy of admiration than a lofty hedge bank, such as may be often seen in the western parts of England, covered by these beautiful plants of numerous species, of all sizes and in different stages of growth. We have often been asked to point out some work which, combining a popular account, with scientific descriptions and characteristic figures, should be equally fitted for the drawing-room or the study, for the amateur or the botanist, and have been compelled to acknowledge that no such book existed. These requisites are at length answered by the work before us, which we are quite convinced cannot be surpassed in the elegance of its numerous figures, equally deserving of praise for their beauty and correctness, and claiming our admiration by the completeness of its account of each species, and the philosophical views and pure love of science displayed in it.

Agreeing as we do with the author in most of his conclusions, we think it right to state a few points in which, in our opinion, the work admits of improvement. We consider the want of any distinct specific characters as a great imperfection; for although the distinctive points are fully stated in the account of each species, yet much difficulty is thereby introduced into the determination of the several plants. More exact references to the works of authors quoted, and the introduction of authorities for those localities in which the author has not himself seen the plants growing, even though he may have had specimens before him, would have been desirable.

A large portion of the introduction is occupied by an account of Mr. Ward's plan for growing plants in closed cases; a plan deserving of much greater attention than it has yet received, from its value in causing the healthy growth of ferns, heaths, saxifrages, and other plants in the centre of the smoky atmosphere of London, its use in promoting the successful transport of plants by sea, and its elegance when employed as an ornament of the drawing-room.

Great stress is laid upon the venation as affording the best ge-

neric characters for ferns, and it cannot be denied, that the form, situation, &c. of the veins assist greatly in distinguishing allied genera; but yet we must express our dissent from the author's opinion, when he says that he "is inclined to believe, that henceforth in the veins* of a new fern will be sought the characters which shall decide its genus," and on this subject we cannot do better than quote an observation of the younger Agardh, contained in his recently published *Recensio specierum generis Pteridis*. He says, "Ex una enim facile altera oritur venarum configuratio, ita ut per seriem specierum maxime affinium, a simplicissima ad compositam structuram sæpe progrediunt venæ, unde species sæpe maxime affines in diversa genera divellerentur;" and afterwards he adds, "Ubi itaque apparenter ex una altera oritur venarum configuratio, hoc caractere tantum innisa genera, summa injuria me judice conduntur. Ad divisiones vero generum exstruendas, venarum decursus et distributio, meo judicio optime adhibentur."

Numerous changes have been made in the nomenclature of the plants, but in all cases the oldest name has been adopted and no new ones are introduced; the localities of each species are given in sufficient detail, and the illustrations are remarkably numerous. In the genus *Woodsia* the species are combined, nor do we know of any certain character by which to distinguish them. In *Cystopteris* also we quite agree in reducing the *native* plants to one species, a careful study of them in a wild state having convinced us that they can only rank as varieties. *C. regia*, Smith, we consider as distinct, but as not having a valid claim to be included in the British lists. We now come to *Polysticum* (*Aspidium*, Sm.) *lobatum*, *aculeatum*, and *angulare*, and here again we agree in most points, but differ from Mr. Newman in believing that the Linnæan *P. Lonchitis* is really the same as the Irish and Scotch plant known by that name, and probably distinct from the protean *P. aculeatum*. *Aspidium dilatatum*, *spinulosum*, and *dumetorum* of Smith are, we think, rightly combined, although several of our most eminent botanists consider them as truly distinct, depending chiefly upon the form and direction of the frond, the position of the upper surface of the pinnae (either in the same plane with the rachis or in different ones,) and upon the much more deeply impressed veins upon the upper surface of the plant usually denominated *A. spinulosum*. See Hooker's Brit. Fl. ed. 4. p. 386, note. Mr. Newman combines *Polypodium*

* This subject has been recently investigated by Mr. Smith of Kew, in a paper read before the Linnæan Society, of which we hope to give an abstract in our next Number.

dryopteris and *calcareum*; but to this we must object, as the character taken from the presence of glandular pubescence in the latter may, we think, be always depended upon. We have examined numerous specimens since the publication of Mr. Newman's work, and find it constantly present in *P. calcareum*, and always wanting in *P. dryopteris*.

In conclusion, we beg strongly to recommend this volume to the notice of our readers, as we are convinced that it is only by an extensive sale that it can ever repay the expense attending its publication.

Iter Hispaniense, or a Synopsis of Plants collected in the Southern Provinces of Spain and Portugal, with Geographical Remarks and Observations on rare and undescribed Species. By Philip Barker Webb. 8vo. Paris, Bethune and Plon; London, Coxhead, 1838.

Otia Hispanica, seu delectus plantarum rariorum aut nondum rite notarum per Hispanias sponte nascentium. Auctore P. B. Webb. Pentas I. Fol. Paris, Brockhaus et Avenarius; London, Coxhead, 1839.

We crave pardon of our subscribers and of the author for not having sooner noticed these two works, the former of which has peculiar interest from its supplying us with a catalogue of the native plants of a region which has received but little attention from naturalists, and which we fear, from the disturbed state of Spain, must long continue to be of difficult access to the student of the peaceful science of botany; and the latter is highly deserving of attention from its splendour and scientific value.

The *Iter Hispaniense* exactly meets our views of the best form in which a local Flora can be presented to the public, that is, that it should be for the most part a mere catalogue of names and localities, referring to the large descriptive works for the specific characters and the greater number of synonyms, but that descriptive critical and geographical observations should be introduced in those cases in which the author supposes that he is possessed of new or little known and valuable information. Several such works have been published of late both in this country and on the continent, and we receive this addition to their number with great satisfaction. The author is well known by the great work which he is publishing in conjunction with M. Sabin-Bertholot under the title of '*Histoire Naturelle des Iles Canaries*,'—a work which we fear has not received that attention from the scientific men of Britain of which it is so highly deserving. The plants are arranged according to the natural

system, commencing, as is now becoming the more frequent plan, with the less perfect plants.

We had intended to have given the specific characters of all the new species contained in this book, but find them to be so numerous that space will not allow us to do so: we must therefore refer to the work itself, which will no doubt soon, if indeed it is not already, be in the hands of all those who are interested in the plants of the South of Europe, only noticing here a few of the more interesting points.

Narcissus juncifolius, La Gasc. Foliis filiformibus, rigidis, acutis convolutis, scapo gracili, subbifloro, brevioribus; petalis ovato-lanceolatis mucronulatis.—*N. juncifolius alter*. Clus. Hisp. 250.

N. Jonquilla, Linn. Foliis angustis, carnosius, angulosis, obtusiusculis, scapo 2—6-floro longioribus; petalis lanceolatis acutis.—*N. juncifolius prior*. Clus. Hisp. 250.

The latter of these plants, which is the Jonquil of the gardens, has not been noticed in its native locality since its first introduction into cultivation by Clusius 250 years since. Mr. Webb finds it upon the grassy slopes upon either side of the long range of the Sierra Morena, to which range of mountains it appears to be entirely confined. It is possible however, as suggested by Mr. Webb, that it may be found hereafter on the chain of Atlas in the northern part of Africa. The former species originally and correctly separated from the Jonquil by Clusius inhabits the warmer and drier parts of the coasts of the Mediterranean.

Pages 11 to 15 are occupied by a very valuable catalogue, with extended observations, and in several cases amended specific characters of all the species of *Quercus* (oaks) noticed by the author in Spain and Mauritania, consisting of 11 species, the last of which, the *Q. pseudo-coccifera*, Labill., but not of *Desf.* is considered as a new species, and named *Q. Calliprinos*, Webb.

Anthemis fuscata, Brot. is formed into a new genus, with the following characters and name (page 37.)

PERIDERÆA, Webb. Involucrum discoideum, imbricatum. Flosculi radii ligulati, disci 5-dentati, superiores steriles. Receptaculum conicum, foveolatum, paleaceum, paleis ad basin latis, fusco-marginatis, tubo corollæ æqualibus, persistentibus, superioribus brevibus, scariosis, caducis. Styli disci ramis exappendiculatis. Achænium exalatum, subquadrangulare, glabrum striatum, calvum, areola terminali indistincta.

Herba littorum maris interni, annua, inodora, glabra, præcox, facie Chamæmeli. Rami foliosi, apice monocephali. Radius albus, repandus. Folia bipinnatifida, lobis incis. Discus fructu

matureo superne nudus, basi collari seu περιδεραίῳ palearum persistentium cinctus.

Sp. 1. *P. fuscata*, Webb. *Anthemis fuscata*, Brot.

At page 48 the *Ulex provincialis*, Loisel, is referred to *U. australis* Clemente, as in the opinion of our author the plants are identical, and therefore the older, although neglected name conferred by Don Simon Clemente must be employed.

We now come to the magnificent work placed second at the head of this article, of which we believe that the first part alone has as yet been published. It is in folio, and is intended to form a volume containing between 50 and 60 uncoloured plates, with accompanying descriptive letter-press. The present number contains 8 pages of letter-press and 5 plates, representing *Holcus cespitosus*, Boiss. ; *Artemisia Granatensis*, Boiss. ; *Cytisus tribracteolatus*, Webb; *Adenocarpus Boissieri*, Webb ; and *Salsola genistoides*, Poir. The latter is a very remarkable plant, having all the appearance in habit, &c. of a *Genista* combined with the characters of a *Salsola*.

The plates appear to us to be of the highest character, being clearly and beautifully executed with very numerous illustrative dissections, and (as far as we can judge without having the plants before us) they are highly characteristic. We hope to have an opportunity of noticing the successive numbers of this work as they appear, and cannot but recommend it strongly to our botanical readers.

On the Organs of Secretion in Plants. A prize question crowned in 1836, by the Royal Society of Sciences of Göttingen. By Dr. F. J. F. Meyen. With Nine Plates. Berlin, 1837.

This Memoir contains a vast number of excellent observations on those organs in plants which possess the property of secreting any substance: a number of admirable drawings illustrate the text. The Royal Society of Göttingen required "an accurate representation of the secreting organs in vegetables with reference to the structure of the secreting parts, and of the effects which secretion in general produces on the process of vegetation." The organs which have the power of secreting have been arranged according to the secretions produced; and the author commences with those which secrete air; he distinguishes between the cavities originating from laceration; and those air cavities or canals formed by the separation of the rows of cells, which may be regarded as widened intercellular passages, frequently have septa consisting of a stellate cellular tissue, and allow therefore of free transmission. He then

passes on to the consideration of the vesicles (*Blasen*) in *Utricularia*, the structure of which is accurately expounded. They are at first filled with a slimy liquid, the place of which is subsequently occupied by air. Then follow the ascidia of *Nepenthes*, which likewise, when young, contain air only. The secretion of water at the apices and margins of the leaves of many plants is not considered to be a secretion, nor could the author find the apertures described by Schmidt, which produce this. In the second chapter those organs are treated of which secrete within the cellular tissue mucus, gum, oil, balsam, and resin. The author regards the resin-canals as widened intercellular passages, having no epidermis, and whose contents are formed by the immediately adjacent cells. In *Rhus typhina* there is no latical sap (*Milchsaft*) nor vessels, but passages with a liquid resin containing much turpentine. In the *Umbellatæ* there is also evident in summer a formation of passages containing an oily liquid. The oil vessels in the seminal envelopes of the *Umbellatæ* possess the same structure, but are smaller than the former. The mucus and gum passages are of similar origin, but are shorter and without lævigated walls. They occur of a very large size in the *Cactææ*, *Malvaceæ*, and *Zamiæ*. The glands are treated of in the third chapter, in which Guettard's observations are maintained against the views of De Candolle. The author divides the glands into external and internal, the former again into simple and compound. The simple are petiolated or nonpetiolated, in the first case similar to glandular hairs; here the formation of hairs is shortly touched upon. The petiolated glands of a number of plants are described and in part figured; they are claimed for the *Chenopodeæ*, where they are said to form respiratory and secreting parts, and the glandular cell to be formed last on the hair; even when a compound gland exists on the hair, it is formed last. The simple nonpetiolated glands comprise the *glandes miliaires* of Guettard, or stomata; the author at present confesses that they possess apertures, but that the two cells act like a kind of sphincter (*Schliessmuskel*), and at the same time have the function of glands. Of the compound glands several are accurately represented, among others those of *Dictamnus*, which moreover have a cavity for the secreted matter; those of the hop, the globules contained in which on their exit into the water present an extremely lively and free movement; those of *Ribes*, *Galium*, &c. The organs secreting a caustic substance in *Urtica*, *Jatropha*, and *Loasa*, and the rotation of the cellular sap in the two latter, are then described, after which follow the compound internal glands without cavities of secretion; when the cells contain small drops of oil or

resin the author terms them Pearl glands, (*Perldrüsen*); these occur in *Cecropia*, *Begonia*, *Piper*, *Bauhinia*, *Urtica*, and many other plants. Remarkable is the ascent (*hinantreten*) of a spiral vessel up to the gland in the marginal glands of *Drosera*; in this case likewise the cellular sap globules possess motion. The consideration of the nectaries, with some reference to Kurr's memoir on this subject, forms the conclusion. The second section treats of the internal glands; they are described and figured from *Dictamnus*, *Ruta*, *Melaleuca*, *Citrus*, *Hypericum*, *Gossypium*, &c. The so-called glands of the *Labiata* are treated of in supplementary notes. The fourth chapter relates to the secretion of peculiar substances by individual cells in the interior of the cellular tissue. It is a well-known fact, observes the author, that individual cells at times contain a colouring substance which the adjacent cells do not exhibit; the formation of chlorophylle must also be regarded as a product of secretion. In the *Lysimachia*, it is in some single large cells that the red resinous pigment is situated, which appears to be composed of a number of minute bars (*Stübchen*). These resinous secretions are exceedingly remarkable in the elongated cells of the parenchyma near the spiral tubes in species of *Aloe*, where at first brown resinous globules occur along with green globules, gradually increase in number, and at last fill in a mass the entire cell. In the roots of the *Valeriana* there are also found, in the outer layers, resinous globules in the cells; a similar occurrence is also described in *Amomum*, *Curcuma*, and other *Scitamineæ*. The fifth chapter is devoted to the consideration of the vital sap or milksap vessels (*vasa laticis*); the author here endeavours to maintain and confirm his opinion that they possess walls, and are therefore true vessels; he also endeavours to demonstrate the motion of the sap in them, although he is not able to establish any result founded on direct observation respecting the terminal extremities and the mode in which the current is carried through the entire plant; he lastly treats of the external structure of the milk sap and its globules, as also of the chemical characters it presents. The sixth chapter contains some concluding remarks; the author enlarges on the phenomena in relation to which substances are secreted externally without the existence of any peculiar apparatus; as in the scales of buds, in the aerial roots of *Maïs*, in the occurrence of tragacanth, in the efflorescence of sugar on *Algæ*, of waxy substances on fruits and leaves, &c. In this memoir, which contains so great and valuable a mass of information, we are glad to find that the author does not give way to a polemical spirit.—*Linnæa*, Part III. 1839.

Descrizione di un nuovo Genere di Piante della Famiglia delle Leguminose, di Guglielmo Gasparini. Description of a new Genus of Plants of the Family *Leguminosæ*, by Guglielmo Gasparini.

Sign. Gasparini has given in a short memoir, published separately, a full description of the *Acacia Farnesiana*, of which it appeared necessary to form a new genus, from its holding an intermediate place between the genera *Lagonychium* and *Acacia*, and forming the transition from the *Mimosæ* to the *Acaciæ*. He terms it *Farnesia*, and thus characterizes it:—

Flores hermaphroditi. Cal. minimus tubulosus 5-dentatus. Cor. gamopetala, minima 5-dentata calyce inserta ac cum ipso coalita. Stam. numerosa exserta, omnino soluta, antheris minimis rotundatis. Pist. corollæ subæquale, ovario oblongo, stylo filiformi, stigmatе oculo nudo inconspicuo. Legumen indehiscens, subteres, subfusiforme, torulosum s. seminibus abortis hinc inde constrictum, sessile, primo pulpa spongiosa farctum deinde cellulosum, nempe ex endocarpio semina involvente ac in sepimenta producto in plures cellulas divisum. Semina nuda.—*F. odora*.

The plant is described at length, and the flowers and fruit delineated on an annexed plate. This small tree is cultivated in Sicily to decorate the garden, under the names of Gaggia or Cassia: its flowers are odorous, but the roots have a bad smell, which is also imparted to the spittle when the seeds have been chewed. It however, in this case, proceeds solely from the radicular end of the embryo.—*Linnaea*, Part III. 1839.

Osservazioni intorno la Durata ed il Germogliamento della Grammite, fatte da Guglielmo Gasparini. Observations on the duration and germination of *Grammitis*, by Guglielmo Gasparini.

The *Grammitis leptophylla*, one of the most frequent ferns occurring on the coast districts of Naples, dies annually towards the end of spring, and shoots forth again in autumn and winter from the spores. The author describes the plant at length, and the process of its germination and development, which, together with the perfect plant, are figured on the first plate. The second plate contains the first stage of development of *Adiantum Capillus Veneris*, *Scolopendrium officinarum*, *Asplenium Adiantum nigrum*, and *Aspidium hastulatum*.—*Ibid*.

PROCEEDINGS OF LEARNED SOCIETIES.

LINNÆAN SOCIETY.

December 17.—Mr. Forster, V.P., in the Chair.

Specimens of the *Lagurus ovatus* collected last summer at Sewer's End, two miles from Saffron Walden, were presented by Mr. Cumming, who discovered the plant about three years ago in that locality, which is its only actual English station.

Read, "Description of the Curata, a plant of the tribe of *Bambuseæ*, of the culm of which the Indians of Guiana prepare their Sarbacans or Blow-pipes." By Robert H. Schomburgk, Esq., communicated by the Secretary.

Referring to a passage in Baron Humboldt's "Personal Narrative" of his Travels in America, in which the learned author describes the reeds of which the Indian Blow-pipes are made, and regrets his inability to determine from what plant they were obtained, Mr. Schomburgk states it to have been a point of the greatest interest with him in his recent journeys in the interior of Guiana to ascertain this fact. He found that the Macusi tribe of Indians obtained these remarkable reeds by barter from the Arecunas, who again made journeys of several months' duration to the westward to procure them from the Maiongcong and Guinan Indians, to whose country they are restricted, and who have thence acquired among the other natives the appellation of the Curata people. The Arecuna thus becomes the medium of the barter carried on of blow-pipes on the one hand for Urari poison on the other, the latter being found in the district inhabited by the Macusi, and exchanged by them for the tube through which the arrows impregnated with it are discharged with such deadly effect. It was at a settlement of Maiongcong Indians near the river Emaruni that Mr. Schomburgk at last succeeded in obtaining positive information of the locality of these reeds, which he was informed were found on two lofty mountains, named by the Indians Mashiatti and Marawacca, the former of which was pointed out to him at the distance of about 20 miles. The latter however lying more directly on his route was visited by him in preference; it is seated at a day's journey from a Maiongcong settlement on the banks of the Cuyaca, from whence the natives showed the beaten track. After having ascended the mountain to a height of about 3500 feet above the Indian village, the traveller followed the course of a small mountain stream, on the banks of which the Curas or Curatas, as these reeds are called by the Indians, grow in dense tufts. They form in general clusters of from forty to a hundred stems, which are pushed forth, as in many other *Bambuseæ*, from a

strong jointed subterranean rootstock. The stem rises straight from the rhizoma, without knot or interruption, and preserving an equal thickness throughout, frequently to the height of 16 feet, before the first dissepiment is stretched across the interior and the first branches are given off. The joints that follow succeed each other at intervals of from 15 to 18 inches; and the whole plant attains a height of from 40 to 50 feet. The stem when full-grown is at the base about an inch and a half in diameter, or nearly 5 inches in circumference; but Mr. Schomburgk mentions having seen young stems, which at the height of 20 feet, and with a thickness of scarcely a quarter of an inch, offered no signs of articulation. The branches are only formed when the stem begins to increase in diameter. The full-grown stem is of a bright green colour, perfectly smooth and hollow within. The branches are verticillate, generally from 3 to 4 feet in length, very slender, terete and nodose; the upper joints separated by an interval of from 2 to 3 inches, and clothed by the sheaths of the leaves, which are split at the apex, persistent, striate and somewhat scabrous. The leaves are linear-lanceolate, obliquely rounded at the base, acute, of a bright green above, glaucescent below, nervoso-striate, with the midrib prominent, and the margin scabrous, from 8 to 9 inches long, and 5 or 6 lines broad; they are furnished with a short petiole, which is articulated to the vagina; and a series of long setæ occupy the place of the ligula. The inflorescence is in terminal spikes, with a flexuose rachis; the locustæ subsessile, lanceolate, lax, from $1\frac{1}{2}$ to 2 inches in length. The entire plant is from 40 to 50 feet in height; but the weight of its innumerable branches causes the slender stem to curve downwards so that the upper part generally describes an arch, which adds greatly to the gracefulness of its appearance. Leaving out of consideration the length of the first nodeless joint, it resembles in its general habit the *Bambusa latifolia* of Humboldt, which Mr. Schomburgk was not unfrequently led into the mistake of confounding with it at a distance. He estimates the height at which it grew as 6000 feet above the level of the sea; and its growth appears to be limited to the chain of sandstone mountains which extends between the second and fourth parallel, and forms the separation of waters between the rivers Parima, Merewari, Ventuari, Orinoco and Negro. The only ascertained localities were Mounts Mashiatti, Marawacca and Wanaya.

Mr. Schomburgk describes at length the process by which the blow-pipes are prepared, and encased, for their better security in the hollowed trunk of a slender species of palm; together with the mode in which other parts of the apparatus are supplied in order to render

it available for its important uses, and the various modifications in its construction occurring among the different tribes. He adds also a particular description of the arrows and quivers in use among several of the native tribes.

To this paper was appended the following note by John Joseph Bennett, Esq. F.L.S.

“Mr. Schomburgk having placed in my hands specimens of the grass which forms the subject of his communication, with a request that (if I should find it to be unpublished) I would describe it, I consulted the publications of Nees von Esenbeck and Kunth, and was at first strongly inclined to suspect that it was identical with the *Arundinaria verticillata* of those authors; but a subsequent examination has satisfied me that it is a distinct species of that genus. I have had no opportunity of comparing it with specimens of *A. verticillata*, but it differs from the descriptions of that species, given by the two eminent botanists above named, in the following particulars. Its leaves are linear, instead of lanceolate, and smooth on both surfaces, instead of scabrous; the mouth of their sheaths is furnished on either side of the articulation of the leaf with a fringe of long rigid setæ, which are not mentioned as occurring in *A. verticillata*; its locustæ are sessile, instead of being pedicelled; and the hypogynous scales are lanceolate and acute, instead of obovate and obtuse. The following character will therefore serve to distinguish the species:—

Arundinaria Schomburgkii.

A. foliis linearibus acuminatis lævibus; vaginarum ore utrinque longè setoso, spicâ simplici pauciflorâ, locustis sessilibus, squamulis hypogynis lanceolatis acutis.”

January 21, 1840.—Mr. Forster, V.P., in the Chair.

Mr. Hewett Cottrell Watson, F.L.S., exhibited specimens of *Carum Bulbocastanum* discovered by Mr. W. H. Coleman, near Cherry Hinton, Cambridgeshire, and of *Seseli Libanotis* gathered by the same in a Dean west of the river Cuckmere, near Seaford, Sussex, being the first time it has been observed in that county.

Mr. Solly, F.L.S., exhibited two splendid drawings executed by Mrs. Withers of a male plant of *Encephalartos pungens*, which flowered in the Royal Botanic Garden at Kew, in October last.

Mr. Iliff, F.L.S., exhibited some urate of ammonia voided by the *Boa Constrictor* at the Surrey Zoological Gardens, in the midst of which were several larvæ supposed by Mr. Curtis to be those of the *Musca Canicularis* of Linnæus. Mr. Iliff is of opinion they were voided with the excrements of the *Boa*, and referred to a case in the

Memoirs of the Medical Society of London, where he believes similar larvæ were voided from the intestines of a man.

Specimens of the *Lastrea rigida* collected at Settle, Yorkshire, were presented by Mr. Daniel Cooper, A.L.S.

Read "Observations on the Ergot." By Francis Bauer, Esq., F.R.S., and L.S.

The author, as is well known, has made the ergot a subject of particular study, and about thirty years ago he undertook, at the suggestion of Sir Joseph Banks, a series of careful microscopical observations, with a view to determine the nature and cause of that singular production, and the beautiful drawings prepared by him at that time, illustrative of the ergot in various stages of its development, form part of the Banksian collections now deposited in the British Museum. Mr. Bauer's investigation led him to determine the ergot to be a morbid condition of the seed, but he was unsuccessful in ascertaining the cause of the disease, which Messrs. Smith and Quekett have satisfactorily shown to be occasioned by a minute filamentous fungus, a fact already recorded at p. 1 & 4. After a long lapse of years Mr. Bauer was induced to resume the subject, and the result has been an additional drawing from his masterly pencil, displaying the minute fungus already noticed in different stages of its growth. The fungus has been named by Mr. Quekett *Ergotætia abortifaciens*.

February 4.—Mr. Forster, V.P., in the Chair.

Read, "On the *Heliamphora nutans*, a new Pitcher Plant from British Guiana." By George Bentham, Esq., F.L.S.

The interesting subject of this communication was discovered by Mr. Schomburgk growing in a marshy savannah on the mountain of Roraima, on the borders of British Guiana, at an elevation of about 6000 feet above the level of the sea. It belongs to the *Sarraceniaceæ*, and constitutes a very distinct genus of that small but remarkable family of plants, hitherto exclusively confined to the United States. The genus is principally distinguished from *Sarracenia* by the entire absence of petals, small apterous stigma, and trilocular ovary.

The following are the characters of this new genus :

HELIAMPHORA.

Perigonii foliola 4, 5, (vel 6 ?) hypogyna, libera, æstivatione valde imbricata, subpetaloidea. *Stamina* numero indefinita, hypogyna. *Antheræ* oblongo-lineares, versatiles, biloculares, loculis oppositis longitudinaliter dehiscentibus. *Ovarium* triloculare, ovulis numerosis anatropis pluri-serialiter placentæ axili affixis. *Stylus* simplex, apice truncatus. *Stigma* parvum, obscure trilobum, minute ciliatum. "*Capsula* trilocularis, trivalvis, polysperma" (*Schomb.*). *Semina* obovata, compressa, testa

fusca laxiuscula, vix rugosa, in alam fusco-membranaceum semen cingentem expansa. *Embryo* parvus, teres, rectus, prope basin albuminis copiosi, radícula juxta hilum, cotyledonibus parvis.

Herba *perennis*, *uliginosa*. Folia *radicalia*; petiolus *tubuloso-amphoræformis*, ore *obliquo margine subrevoluto*. Scapus *erectus*, apice *simpli-citer racemosus*, *glaber*. Flores *nutantes*, *albi v. pallide rosei*.

1. *H. nutans*.

Read a paper, entitled "On the Structure of the Tissues of *Cycadeæ*," By D. Don, Esq., Libr. L. S., Prof. Bot. King's College.

In *Coniferæ* the structure of the stem presents the ordinary appearance of dicotyledonous trees; the annual layers are distinctly marked, and there is a regular bipartition of each into wood and bark (liber); but in *Cycadeæ* no bipartition takes place of the fibro-vascular bundles, which in that respect resemble those of monocotyledonous plants, and the differences otherwise are very striking, *Cycas* having, besides a large central pith, several thick concentric alternating layers of cellular and fibro-vascular tissue; and in *Zamia* and *Encephalartos*, besides the pith, there are only two very thick layers, one of fibro-vascular, and the other, which is also the exterior one, of cellular tissue. The great peculiarity of the *Coniferæ*, and which distinguishes them as well from *Cycadeæ* as from every other family, is the remarkable uniformity of their woody tissue, which consists of slender tubes, furnished on the sides parallel to the medullary rays with one or more rows of circular or angular dots; but in *Cycadeæ* no such uniformity is observable, their tissue, as in other phænogamous plants, consisting of two kinds of vessels, namely of slender transparent tubes, without dots or markings, and of dotted, reticulated and spiral vessels, which are capable of being unrolled. The former are identical with the fibrous or woody tissue, whilst the latter, which form a part of each bundle, can only be compared to the strictly vascular tissue of other plants. These dotted vessels in *Cycadeæ* bear a considerable resemblance to the vessels of *Coniferæ*, and especially to those of *Dammara* and *Araucaria*, from the dots being disposed in rows, and confined to the two vertical sides of the vessel only, and they are moreover alternate, as in the two genera just mentioned. In *Cycadeæ*, however, the dots present much less regularity in number and size than in *Coniferæ*, not only in different vessels of the same bundle, but in different parts of the same vessel, forming one, two, three, four, and five rows; and they are not always confined to the vertical sides, but appear in some cases to follow the entire circle of the vessel. Their form is oblong, or elliptical, in *Cycas revoluta*, *circinalis*, *glauca*, and *speciosa*, *Zamia furfuracea* and *pumila*, as well as in *Encephalartos horridus* and *spiralis*; but they are sometimes longer, narrower and nearly linear, giving the vessel

the appearance of being marked with transverse stripes. The vessels in all present so much similarity, that no generic distinction can be drawn from them. The dots are always arranged diagonally. The dotted vessels of *Zamia furfuracea* and *pumila* were observed to unroll spirally in the form of a band, presenting a striking resemblance to those of Ferns. The band was found to vary in breadth in different vessels, and was furnished with transverse rows, composed of two, three, or more dots. The coils followed the direction of the dots, and the unrolling was from right to left. In *Cycas revoluta* dotted vessels frequently occur with a single row of dots; but, from the circumstance of the dots on both sides being in view at the same time, they are liable to be mistaken as having a double row on each side. Besides the dotted vessels, there occurs throughout *Cycadeæ* another variety, differing but little from the ordinary spiral vessel, except in the tendency of the coils to unite. In some vessels the coils are free, and the fibre exhibits frequently, at intervals, bifurcations or narrow loops; in others the coils unite at one or both sides, in which case the vessel presents a series either of rings or bars; the fibre then is with difficulty unrolled, and it often breaks off into rings, or the bars separate at the point where the coils unite, which is generally on the perpendicular sides of the vessel. In other cases the vessels are distinctly reticulated, and they then exhibit a striking analogy to the dotted cellules in *Cycas revoluta*. All these modifications are frequently to be observed in the same vessel in *Zamia furfuracea* and *pumila*, a fact which affords conclusive evidence of the accuracy of the theory advanced by Meyen, which refers the spiral, annular, reticulated, and dotted vessels to a common type. The dots and stripes are evidently the thinnest portions of the tube, being most probably parts of the primitive membrane remaining uncovered by the matter subsequently deposited on the walls.

The cellular tissue of *Cycadeæ* consists of tolerably regular parenchyma, composed of prismatic, six-sided cellules. In the species of *Zamia* and *Encephalartos*, so often referred to, the walls of the cellules appear to be of a uniform thickness and transparency, and destitute both of dots or markings; but in the adult fronds of *Cycas revoluta* a different structure presents itself, for the walls of the cellules are furnished with numerous elliptical, obliquely transverse dots or spaces, where the membrane is so exceedingly delicate and transparent as to give to the cellules the appearance of being perforated by holes, the intervening spaces being covered by incrustating matter, disposed in the form of confluent bands, which, when viewed under the microscope, resemble a kind of network. The

dots or spaces uncovered by incrustating matter, are generally of a large size, and occur more particularly on the vertical sides of the cellules, a band usually running along the middle of the two opposite sides. The bands vary in breadth, as do the dots, and they not unfrequently exhibit minute transparent points or spaces where the solid matter forming the band shows a tendency to separate. The extreme delicacy and transparency of the dots or spaces of whatever size, appear fully to prove that they are parts of the primitive membrane of the cellule, which are uncovered by the incrustating matter. A solution of iodine will be found of great service in determining the actual existence of the membrane at those parts; for although it does not materially alter its colour, it tends very much to diminish its transparency and renders it distinctly visible, so as to leave no doubt that the spaces are not openings. The bands are evidently the result of a partial lignification; and indeed no better example can be offered than *Cycas revoluta* to illustrate and confirm the correctness of the views advanced by Schleiden as to the origin of the bands and fibres in the cellules and vessels of plants. Being anxious to ascertain whether the bands exist at an early period, the author had recourse to the examination of a young undeveloped frond, about two weeks old, and he was much gratified by finding his previous suspicions fully confirmed; the cellules then being of a uniform transparency, presenting neither bands nor dots, but furnished with a distinct cytotblast or nucleus, which was found to have entirely disappeared from those cellules in which the incrustating matter was visible, proving that the incrustating matter is formed at the expense of the nucleus. The matter forming the bands is continuous, and is evidently not formed by a coalescing of spiral fibres, as some might suppose; for it is perfectly solid, and shows no disposition to unroll or to break up into fibres. The bands most probably originated from the shrinking up of the incrustating substance, which at first was equally diffused in a fluid state over the walls, and which, from the mere effects of consolidation, aided by the distention, and perhaps enlargement of the cellule, would naturally leave portions of the primitive membrane uncovered. That the dotted and reticulated vessels in *Cycadeæ* are of the same nature, and originate in a similar way as the cellules just described, there seems no reasonable ground to doubt. The parenchymatous cellules in *Cycas circinalis*, *glauca*, and *speciosa* resemble those of *Zamia* and *Encephalartos* in having their walls of a nearly uniform thickness and transparency, being but rarely furnished with a few elliptical obliquely transverse spaces

or dots. The cellules in *Cycas revoluta* vary both in size and structure, some being three or four times longer, whilst others are still longer and narrower, and furnished with more numerous and much smaller dots, which are not confined to the sides, but are disposed around the tube. These last, which have been observed also in *Cycas glauca* and *circinalis*, present an evident transition to the dotted vessels.

The whole of the *Cycadeæ* are supplied with numerous gummiferous canals, often of great length, and uniformly furnished with distinct cellular walls of considerable thickness, and which have been accurately described and figured by Professor Morren in a recent memoir.

Notwithstanding the analogies presented by their reproductive organs, the author considers the *Cycadeæ* as related to *Coniferae* only in a remote degree, and that they constitute the remains of a class of plants which belonged to a former vegetation.

ZOOLOGICAL SOCIETY.

June 25, 1839.—Dr. Bostock in the Chair.

A paper by T. C. Eyton, Esq., entitled "Catalogue of a Collection of Birds from Malaya, with descriptions of the new species," was read.

"The collection of Birds, of which the following is a catalogue, are in the possession of Mr. Evans, of the Wyle Cop, Shrewsbury, having been collected by his brother in the above-mentioned country. This collection is particularly interesting when taken in conjunction with that of the neighbouring islands of Sumatra and Java, an account of which is published in the Transactions of the Linnæan Society, vol. xiii., by Sir T. Stamford Raffles and Dr. Horsfield.

"The zoology of Malaya is altogether highly deserving of the attention of the naturalist, presenting as it does a connecting link between those families of which Australia is the metropolis, and the forms of the Old World. The ornithology of Australia is distinguished by the number of species belonging to the family *Meliphagide* which it produces, and we find from the present catalogue and that above-mentioned, that the Indian islands and the Malay peninsula also possess a greater number of species belonging to this family than any other portion of the world excepting Australia. This transition may also be traced through the marsupial animals, and man, the Malay variety of the human species approaching nearer to the Australian than any other in the form of the cranium.

"The present collection contains eighty-nine species, of which several are new to science; there are also some entirely new genera:

it is singularly deficient in Raptorial and Natatorial birds, not possessing one of either order; but this perhaps may be owing to the collection having been made chiefly in the interior."

Podargus Javanicus, Horsf. Native name, *Burong Saiang*.

Harpactes Duvaucelii, Gould. Native name, *Burong Mass*.

Harpactes Diardii, Gould. Native name same as preceding.

Eurystomus cyanocollis, Vieill. Native name, *Tihong Lampay*.

The collection contains both male and female; the latter is merely distinguished from the former by its more obscure colouring.

Eurylaimus Corydon, Temm.

Cymbyrhynchus cucullatus. *Eurylaimus cucullatus*, Temm.

Native name, *Tamplana Lilin*.

Cymbyrhynchus nasutus, Vig. Native name, *Burong Ujuu*.

Halcyon Capensis, Sw. Native name, *Burong Kaha*.

HALCYON VARIA. *H. pectore, guld, ventre, strigæque oculos cingente ferrugineis; capite, nuchâ, et strigâ a mandibulâ inferiore ad capistrum brunneis, singulis pennis tenuis cæruleis ornatis: primariis, dorso, scapularibusque, brunneis, his externè flavo marginatis, illis maculatis; rostro flavo, culmine obscuro.*

Long. tot. $8\frac{1}{4}$ unc.; rostri, $1\frac{1}{4}$ unc.; tarsi, $1\frac{1}{8}$.

Native name, *Kaing Kaing*.

Halcyon pulchella. *Dacelo pulchella*, Horsf.

Native name, *Kaing Kaing Kimba*.

Alcedo Smyrnensis, Lath. See *Kaing Kaing*.

Alcedo cærulea, Linn. Native name, *Raja Ulang*.

Nyctiornis amictus, Sw. *Merops amictus*, Temm.

Native name, *Kay Chua*.

Merops Javanicus, Horsf. Native name, *Berray Berray*.

Cinnyris Javanicus, Steph. Native name, *Clichap*.

Cinnyris affinis, Horsf. Native name, *Major*.

Calyptomena viridis, Raff. Native name, *Siebo*.

Chloropsis Malabaricus, Jard. and Selby. Native name, *Burong daou*.

The female differs from the male in having the markings less distinct.

Chloropsis Sonneratii, Jard. and Selby. Native name, *Mirbadaon*.

The female and young are destitute of the black throat, a straw-coloured mark being sometimes substituted for it.

Irena puella, Horsf. Native name, *Krouing*.

Muscipeta paradisea, Le Vaill. Native name, *Mira jabone*.

MUSCIPETA ATROCAUDATA. *Mus. toto corpore purpureo-atro, sed pectore imo abdomineque albis.*

Long. tot. 9 unc.; rostri, $\frac{1}{2}$ unc.; tarsi, $\frac{1}{7}$ unc.

Native name, *Murra jabone*.

Genus MICROTARSUS, n. g.

Rostrum ferè capiti æquale, altius quàm latum, ad apicem incisum, ultraque nares compressum, ad basim setis armatum; *nares* membranaceæ, parvæ, rotundatæ.

Tarsi brevissimi, superiore parte plumati; *digiti* debiles, externi vix longiores quàm interni; posteriores medios æquantes; *ungues* compressi, posteriores longissimi; *scuta* tarsi indivisa.

Alæ mediocres rotundatæ, primâ pennarum spuriâ, secundâ brevior tertîâ, tertiâ duabusque proximis inter se æqualibus.

Cauda rotundata tectricibus superioribus mollibus et longis.

Obs. The above genus is closely allied to *Micropus* of Swainson.

MICROTARSUS MELANOLEUCOS. *Micr. ater, tectricibus primariis apicibus albis; rostro pedibusque atris.*

Long. tot. $6\frac{1}{4}$ unc.; *rostri*, $\frac{1}{2}$ unc.; *tarsi*, $6\frac{1}{2}$ unc.

Native name, *Mirba tando*.

Genus MALACOPTERON, n. g.

Rostrum ferè capiti æquale, altius quàm latum, ad apicem incisum, ultraque nares compressum, ad basim setis armatum; mandibulâ inferiore ad basim tumidâ.

Tarsi mediocres; *digiti* externi vix longiores quàm interni, posteriores medios æquantes; *ungues* compressi posteriores longissimi; *scuta* tarsi vix divisa.

Alæ breves, rotundatæ; pennis secundariis primarias ferè æquantibus; primâ pennarum spuriâ, secundâ brevior tertîâ, quæ longissima est.

Cauda paucarum pennarum composita, rotundata; tectricibus superioribus mollibus et longis.

Obs. This genus is allied to *Microtarsus* in some particulars and to *Brachypus* in others: it agrees with both in the soft and downy nature of the tail coverts.

MALACOPTERON MAGNUM. *Mal. fronte caudâque ferrugineis, nuchâ atrâ, dorso strigâque transversâ pectore, cinereis, alis brunneis, rostro flavo.*

Long. tot., 6 unc.; *rostri*, $\frac{7}{8}$ unc.; *tarsi*, $1\frac{9}{16}$ unc.

Fem. mare minor, capite nuchâque ferrugineo et atro maculatis.

Native name, *Burong Map*.

MALACOPTERON CINEREUS. *Mal. feminae speciei præcedentis similis sed magnitudine multùm inferior.*

Long. tot. $5\frac{1}{2}$ unc.; *rostri*, 5 lin.; *tarsi*, 8 lin.

Brachypus entylotus, Jard. and Selb. Native name, *Merfa*.

BRACHYPTERYX NIGROCAPITATA. *Bra. vertice atro, genis cinereis, gula albâ, dorso caudâque brunneis, pectore abdomineque ferrugineis hoc obscurissimo; rostri mandibulâ superiore fuliginosâ, inferiore flavâ, tarsis pedibusque brunneis.*

Long. tot. $6\frac{1}{2}$ unc.; *rostri*, $\frac{1}{2}$ unc.; *tarsi*, $1\frac{1}{16}$ unc.

Dicrurus Malabaricus, Steph. Native name, *Chanwee*.

Obs. *Dic. æratus* of Stephens is the female of this species.

Lanius virgatus, Temm. Native name, *Burong Tana*.

LANIUS STRIGATUS. *Lan. dorso, caudâ alisque ferrugineis, illo atro strigato; paucis pennis tertiarum et flexurâ alarum lined atris; capite cinereo, sparso et strigato atro; corpore subtùs obscurè albo; lateribus pectoreque parçè atro strigatis; rostro apice atro, basi albd; tarsis pedibusque brunneis.*

Long. tot. $6\frac{1}{2}$ unc.; rostri, $\frac{7}{8}$ unc.; tarsi, $\frac{9}{12}$ unc.

Obs. This is probably a young bird.

Lamprotornis chalybeus. *Turdus chalybeus*, Horsf.

Native name, *Terling*.

Turdus Mindanensis, Gmel. Native name, *Murray*.

Kittacincla macrourus, Gould. *Turdus macrourus*, Gmel.

Native name, *Mura buta*.

TURDUS MODESTUS. *Tur. dorso, tectricibus alarum, verticeque olivaceo-brunneis; paucis tectricum primarium præpilatis albo; primariis caudâque brunneis; gulâ, strigâ oculari abdomineque albis, illâ maculis cinereis sparsâ; lateribus capitis, et pectore inferiore cinereis; lateribus pectoreque superiore ferrugineis; mandibulâ superiore pedibusque brunneis, inferiore flavâ.*

Long. tot. $8\frac{3}{4}$ unc.; rostri, $\frac{7}{8}$ unc.; tarsi, $1\frac{1}{8}$ unc.

Native name, *Kwaran*.

PASTOR MALAYENSIS. *P. dorso, caudâ alisque viridi-æneis; tectricibus tertiariis abdomineque albis; vertice nuchâque pennis elongatis, cinereis; paucis pennis viridi circumclusis; mento albo; corpore subtùs cinereo.*

Long. tot. $6\frac{3}{4}$ unc.; rostri, $\frac{1}{2}$ unc.; tarsi, 1 unc.

Fem. dorso brunneo; reliquis coloribus obscuris.

Native name, *Brass Brass*.

Iora scapularis, Horsf. Native name, *Durong Capas*.

Genus CRATAIONYX, n. g.

Rostrum forte; mandibulâ superiore arcuatâ, mediocri; nares rotundatæ, basales, setis brevibus tectæ.

Pedes validi syndactyli; digitis medio posteriori inter se æquantibus, exterioribus interioribus vix longioribus.

Tarsi validi elongati; ungues validi, posteriores maximi.

Alæ remigibus primariis spuriis, secundis vix brevioribus tertiis; 4^{tis}, 5^{tis}, 6^{tisque} inter se æqualibus.

Cauda longa rotundata.

CRATAIONYX FLAVA. *Crat. ater vertice cristato; abdomine pectoreque inferiore flavis; tarsis pedibusque flavis.*

Long. tot. 7 unc.; rostri, $\frac{1}{2}$ unc.; tarsi, $1\frac{9}{12}$ unc.

Native name, *Seray Seray*.

CRATAIONYX ATER. *Crat. ænea, vertice cristato; abdomine pectoreque inferiore, flavis; tarsis pedibusque flavis.*

Long. tot. 7 unc.; rostri, $\frac{1}{2}$ unc.; tarsi, $1\frac{9}{12}$ unc.

Oriolus xanthonotus, Horsf. Native name, *Simpelong Rait*.

Oriolus Sinensis, Linn. Native name, *Kapindary*.

Gracula religiosa, Auct. Native name, *Tchong*.

Platylophus galericulatus, Temm. Native name, see *Jerray*.

Pitta brachyura, Auct. Native name, *Mortua Plando*.

PITTA COCCINEA. *P. occipite, nuchâ, corporeque subtus coccineis ; alis, dorso, caudâ, strigâque utrinque nuchæ, cyaneis ; gutture ferrugineis ; lateribus capitis, pedibus, rostroque atris.*

Long. corp. 8 unc. ; rostrum, $\frac{3}{4}$ unc. ; tarsi, $1\frac{1}{2}$ unc.

Native name, same as the last.

BUCEROS BICOLOR. *Buc. ater, rectricibus tertiis lateralibus caudæque apicibus albis ; rostro albo, strigâ cingente basim atrâ ; casside mediocri carinatâ à dimidio capitis ad bis trientis rostri tendente.*

Long. corp. $33\frac{1}{2}$ unc. ; rostri, 6 unc. ; carina cassidis, 5 unc. ; tarsi, $2\frac{1}{2}$ unc.

Jun. casside non perfectâ et atrâ. Native name, *Kay Kay*.

Euplectes Philippinensis. *Loxia Philippinensis*, Linn.

Native name, *Tampua*.

ANTHUS MALAYENSIS. *An. dorso brunneo, marginibus pennarum saturationibus ; corpore subtus ferrugineo leviter tincto ; duabus rectricibus exterioribus caudæ albis ; pectore maculis brunneis adperso ; primoribus marginibus exterioribus flavis.*

Long. tot. $6\frac{3}{4}$ unc. ; rostri, $\frac{1}{2}$ unc. ; tarsi, $1\frac{1}{8}$ unc. ; ung. post. $\frac{1}{2}$ unc. Native name, *Lanchar*.

The present species, which is the *An. pratensis* of Raffles, and of which the collection possesses two specimens, is nearly allied to *Anthus trivialis*, but differs in being of a larger size.

Dicaeum cantillans, Ste.

Dicaeum saccharina. *Certhia saccharina*, Lath. Nat. name, *Nella*.

Dicaeum cruentata, Horsf.

DICÆUM IGNICAPILLA. *Dic. dorso, caudâ, tectricibus alarum, primariis externis partibus, lateribusque capitis obscure azureis ; strigâ oculari atrâ ; gulâ corporeque subtus aurantiacis ; maculâ pectorali verticeque rubris.*

Long. tot. $3\frac{1}{2}$ unc. ; rostri, $\frac{7}{8}$ unc. ; tarsi, $\frac{1}{2}$ unc.

Native name, *Naloo*.

Fem. supernè cinerea subtusque flava irregulariter cinereo-maculata ; rubro cristata.

ANTHREPTES FLAVIGASTER. *An. capite, dorso, pectore colloque cinereo-viridibus ; corpore subtus flavo ; alis, caudâ tectricibusque alarum brunneis ; rostri mandibulâ superiore atrâ, inferiore flavâ ; pedibus brunneis.*

Long. tot. 8 unc. ; rostri, $1\frac{5}{8}$ unc. ; tarsi, $1\frac{9}{16}$ unc.

Native name, *Chichap Rimba*.

ANTHREPTES MODESTA. *An. vertice, dorso, alis, caudâque viridi-olivaceis hâc singulis pennis mediis brunneis, illâ præpilatâ atro ; corpore subtus viridi, singulis pennis in mediis obscuris ; rostro pedibusque brunneis.*

Long. tot. $6\frac{1}{2}$ unc. ; rostri, $1\frac{1}{4}$ unc. ; tarsi, $\frac{5}{8}$ unc.

Native name, *Chichap Nio*.

Phœnicophaus tricolor, Steph. Native name, *Kado besar*.

Phœnicophaus chlorocephalus. *Cuculus chlorocephalus*, Raffles.

Native name, *see Lahia*.

Phœnicophaus Crawfordii, Gray. Native name, *Kada Kachie*.

Phœnicophaus Javanicus, Horsf. Native name, *Kada Apie*.

PHÆNICOPHAUS VIRIDIROSTRIS. *Phæn. alis dorso caudâque castaneis; primariis apicibus brunneis; rectricibus caudæ apicibus albis, ponè strigâ atrâ ornatis; capite, collo, pectoreque superiore cinereis, corpore subtùs ferrugineo.*

Long. tot. 13 unc.; rostri, 1 unc.; tarsi, 1 unc.

Native name, *see Lahia*

Psittacula Malaccensis, Kuhl. Native name, *Tana*.

Bucco trimaculata, Gray. Native name, *Tanda*.

Bucco versicolor, Raff. Native name, *Tahoor*.

BUCCO QUADRICOLOR. *Buc. viridis; primariis brunneis; rectricibus caudæ inferioribus partibus azureis; fronte aureo, maculâ coccineâ posteriore utrinque ad latus locatâ; strigâ peroculari atrâ, hâc anticè maculâ coccineâ, infrâ azureâ ornatâ; gulâ coccineâ; pectore superiore cæruleo maculis coccineis ornato; maculâ flavâ ad angulum inferius rostri; rostro, tarsis, pedibusque atris.*

Long. tot. $8\frac{1}{2}$ unc.; rostri, $1\frac{1}{2}$ unc.; tarsi, $1\frac{1}{8}$ unc.

Native name, *Tahoor Capata Cuning*.

Genus **MEGALORHYNCHUS.** n. g.

Rostrum validum culminatum, carinâ basali vix ad apicem aduncâ; altius quàm latum; nares magnæ, basales, rotundatæ; setis tectæ.

Pedes scansorii; digiti bini locati; exteriores singulis partibus æquales et longiores quàm interiores; posteriores et exteriores brevissimi.

Alæ primis pennarum spuriiis, secundis brevibus, tertiis, 4^{tis}, 5^{tis}, 6^{tis}, inter se æqualibus.

Tarsi mediocres.

Cauda rotundata, mediocris.

MEGALORHYNCHUS SPINOSUS. *Meg. superioribus partibus brunneis; pennis præpilatis oleæ colore, vertice pennis mediis spinosis, oculis spatiis nudis et rubris circumdatis; gulâ obscure ferrugineâ; corpore subtùs sordidè albo.*

Long. tot. $6\frac{1}{2}$ unc.; rostri, $\frac{11}{12}$; tarsi, $\frac{8}{12}$ unc.

Native name, *Ariko Berine*.

Chrysonotus Tiga. *Picus Tiga*, Horsf.

Native name, *Glato*.

Chrysonotus miniatus. *Picus miniatus*, Gmel.

Native name, *Glato*.

Picus validus, Temm. Native name, *Glato*.

Hemicircus badius, *Picus badius*, Raff.

HEMICIRCUS BRUNNEUS. *Hem. brunneus transversim ferrugineo*

strigatus; *gula strigis minutis*; *vertice genisque brunneis et non strigatis*; *macula oblonga ad latera cervicis flavo-ferruginea*; *nota ab angulo inferiore rostri utrinque ad gulam tendente coccinea*.

Long. tot. $7\frac{3}{4}$ unc.; *rostri*, 1 unc.; *tarsi*, $\frac{3}{4}$ unc.

Hemicircus tristis. *Picus tristis*, Horsf.

Picus poicilolophus, Temm. Native name, *Glato*.

Polyplectron Chinquis, Temm.

Nycthemerus erythrophthalmus. *Phasianus erythrophthalmus*, Raffles. Native name, *Pagas*.

Cryptonyx coronatus, Temm. Native name, *Bestum*.

PERDIX ÆRUGINOSUS. *Perd. æruginosus*; *tertiariis transversim strigatis atro*; *abdomine gulaque saturatioribus*; *nullo calcare*; *rostro tarsisque atris, illo forti*.

Long. tot. 10 unc.; *rostri*, $\frac{5}{8}$ unc.; *tarsi*, $1\frac{3}{4}$ unc.

Native name, *see Hole*.

Hemipodius Taigour, Sykes. Native name, *Pochio*.

HEMIPODIUS ATROGULARIS. *Hem. gula pectoreque superiore atris*; *pennis ad latera colli albis atro præpilatis*; *illis verticis et frontis atris, albo præpilatis*; *dorso brunneo, singulis pennis transversim strigatis atro, et maculis parvis albis sparsis*; *tectricibus atro præpilatis, et transversim latè strigatis flavo-ferrugineo*; *tectricibus caudæ ferrugineis, et super caudam tendentibus*; *lateribus atris*; *rostro aurantiaco pedibus, tarsisque brunneis*.

Long. tot. $6\frac{1}{2}$ unc.; *rostri*, 7 lin.; *tarsi*, 1 unc.

Native name, *Pochio*.

Coturnix Sinensis, Temm. Native name, *Pechan*.

Columba Javanica, Gmel. Native name, *Paonay Crochi*.

Columba jambu, Gmel. Native name, *Paonay Gadang*.

Vinago vernans. *Columba vernans*, Linn.

Native name, *Paonay Crochi*.

Vinago Olax. *Columba Olax*, Temm.

Native name, *Semboan*.

Rallus gularis, Horsf. Native name, *Rentar*.

Gallinula phænicura, Lath. Native name, *Roa Roa*.

Porphyrio Indicus, Horsf. Native name, *Burong Tedone*.

Charadrius Virginianus, Bostik. Native name, *Kangbang Saut*.

Totanus Damacensis, Horsf. Native name, *Kadidie*.

Scolopax heterura, Hodgs. Native name, *Reshail*.

Mr. Waterhouse read a paper on a new species of Rodent which had been sent from the island of Luzon, one of the Philippines, by Hugh Cuming, Esq., Corresponding Member.

In general appearance this Rodent might be mistaken for a species of *Capromys*; in size it is about equal to the *C. Fournieri*; the gene-

ral characters of the skull and dentition, however, indicate that its affinity is with the *Muridæ*.

“The skull, compared with that of the common Rat, differs in being of a more ovate form, the occipital portion being somewhat elongated, and considerably contracted; the width between the orbits is comparatively great; and behind the orbits the frontal bones are expanded, and join with the temporal to form a distinct post-orbital process. The interparietal bone, instead of being transverse, is almost circular. The auditory bullæ are very small. The interdental portion of the palate is slightly contracted in front, so that the molares diverge posteriorly; the rami of the lower jaw are less deeply emarginated behind, the coronoid portion is smaller, and the descending ramus is broader and rounded; the symphysis menti is of considerable extent. The incisor teeth are less compressed and less deep from front to back. The molar teeth are of a more simple structure; the anterior molar of the upper jaw consists of three transverse lobes, and the second and third consist each of two transverse lobes. In the lower jaw the anterior molar consists of four lobes, a small rounded lobe in front, followed by two transverse lobes, of which the anterior one is the smaller, and finally a small transverse posterior lobe; the second molar consists of two equal transverse lobes, and a small lobe behind them; the last molar consists of two simple transverse lobes.”

On account of the differences observable in the structure of the teeth, and form of the skull, combined with the hairy nature of the tail and ears, Mr. Waterhouse regarded this animal as constituting a sub-genus, and proposed for it the name of *Phlæomys*, this name being suggested by the habit of the animal, which Mr. Cuming (after whom the species is named) states, feeds chiefly on the bark of trees. It may be thus characterized :

MUS (PHLÆOMYS) CUMINGI. *M. vellere setoso, suberecto, pilis lanuginosis intermixtis; auribus mediocribus extus pilis longis obsitis; mystacibus crebris et perlongis; pedibus permagnis et latis, subtus nudis; caudâ mediocri, pilis rigidis et longis (ad Murem Rattum ratione habitâ) crebrè obsitâ: colore nigrescenti-fusco sordidè flavo lavato, subtus pallidiorè; caudâ nigrescente; pilis longioribus in capite et dorso nigris.*

	unc.	lin.
Longitudo capitis corporisque	19	0
———— caudæ	13	0
———— antepedis (unguibus exclusis)	1	8½
———— tarsi	2	10
———— auris	1	0
———— cranii ossei	2	4
Latitudo ejusdem	1	8½

Hab. apud insulam Luzon.

July 9, 1839.—The Rev. J. Barlow in the Chair.

A letter addressed to Col. Sykes by Sir John McNeill was read. It related to a Dog recently presented by that gentleman to the Society. This kind of dog, Sir John McNeill states, is used by the wandering tribes in Persia to guard their flocks: it is a shaggy animal, nearly as large as a Newfoundland, and very fierce and powerful. The dam of the animal at the menagerie killed a full-grown wolf without assistance.

A letter from Augustus Elliott Fuller, Esq., was read. In this letter, which is addressed to the Secretary, and is dated June 29, 1839, Mr. Fuller encloses an account from his head keeper, Henry Cheal, respecting two broods of Woodcocks (*Scolopax rusticola*), which were bred in the woods of Mr. Fuller's estate at Rose Hill in Sussex.

The two broods referred to consisted each of four birds, and when first observed, about the second week in April, they could but just run; as they grew very fast, however, they were soon able to fly. Mr. Fuller's keeper believes the young woodcock is able to run as soon as hatched, and states that, according to his own observation and the report of others, they always build in a small hole, which they make on the plain ground: they select a dry situation for the nest; but this is placed near a moist soil, to which the old birds lead their young to procure food.

Mr. Waterhouse pointed out the distinguishing characters of a new species of Toucan, which had been forwarded to the Society by the President, the Earl of Derby, for exhibition and description.

This species of Toucan approaches most nearly in size and colouring to the *Pteroglossus hypoglaucus* of Mr. Gould's Monograph; but the beak, which is totally black, is much smaller, and less arched; the nostrils do not extend so far forwards, and are hidden by the feathers of the head, and there is no longitudinal groove in front of them, as in the species above named, and others of the genus; the blue of the under parts of the body is of a much paler and purer tint, and the feathers on these parts are white at the base. It differs, moreover, in having the throat and cheeks white, and the upper tail-coverts black.

A totally black beak being an uncommon character in the species belonging to the subgenus *Pteroglossus*, Mr. Waterhouse proposed for this new species the name *nigrirostris*, and proceeded to characterize it as follows:

PTEROGLOSSUS NIGRIROSTRIS. *Pt. rostro, capite summo, nuchæque nigris; gula alba; corpore supra olivaceo-fusco; rectricibus secundariis olivaceo-viridibus; uropygio pallide sulphureo: caudâ,*

tetricibus caudæ, nigrescenti-viridibus, plumis quatuor intermediis ad apicem, femoribusque castaneis : corpore subtus pallidè cyaneo, crisso coccineo, pedibus nigris.

Long. tot. 20 unc. ; rostri, $3\frac{2}{12}$; alæ, $6\frac{3}{4}$; caudæ, 7 ; tarsi, $1\frac{1}{2}$.

Hab. — ?

Mr. Fraser read his descriptions of two new species of Birds, from a collection made in the Island of Luzon, and recently forwarded to the Society by Hugh Cuming, Esq., Corresponding Member. The first of these belongs to the family *Cuculidæ*, the genus *Phænicophaus*, and to Mr. Swainson's subdivision of that genus, to which he has applied the name *Dasylophus*. It may at once be distinguished from all the known members of the family by the singular structure of the feathers of its crest and throat : the shafts of these feathers are expanded at their extremities into laminæ, which may be compared to the shavings of whalebone ; and in this respect they resemble the feathers of the crest of the Toucan, to which Mr. Gould in his Monograph applies the name *Pteroglossus ulocomus*, which is the *Pt. Beauharnesii* of Wagler*, but are not curled as in that species.

The feathers above the nostrils, of the crest and chin, and along the middle of the throat, are gray at the base ; have a decided white spot towards the middle, and are terminated by a broad expansion of the shaft, which is of a glossy black colour, and exhibits blue or greenish reflections. The external edge of this expanded portion of the shaft is minutely pectinated. The occiput and sides of the head are gray, passing into dirty white on the cheeks and sides of the throat : the hinder part and sides of the neck, and the breast, are of a deep chestnut colour ; the back, wings, and tail are of a deep shining green colour ; all the tail-feathers are broadly tipped with white ; the vent, thighs, and under tail-coverts are dusky brown, tinged with green ; the bill is horn-colour, and the feet are olive.

This beautiful and interesting species Mr. Fraser proposed to name after its discoverer Mr. Cuming. Its principal distinguishing characters may be thus expressed :

PHÆNICOPHAUS CUMINGI. Ph. cristatus, plumis cristæ et gutturis laminis corneis ovalibus splendide nigris terminatis ; nuchæ, et pectore castaneis ; facie pallidè cineræ ; alis et caudâ metallice virescentibus, hac ad apicem albâ.

Long. tot. 16 unc. ; rostri, $1\frac{1}{2}$; alæ, 6 ; caudæ, 8 ; tarsi, $1\frac{1}{4}$.

To the bird above described the following memorandum was attached :—" *Ansic En Bicol*, language of Albay. Eyes red, pupil

* Oken's *Isis* for 1832, part iii. p. 279 ; also in the ' *Ausland*, ' 1830, No. 118, p. 470.

large and black, length from beak to tail, $8\frac{1}{2}$ inches, around the body 5 inches." Signed H. Cuming.

The second bird characterized by Mr. Fraser is a new species of Duck (*Anas*), which is nearly allied to the *Anas superciliosa*, Gmel., but differs in being of a smaller size, in having the whole of the plumage much lighter in colour, and in the sides of the head and neck being rufous, instead of pale buff: it moreover has but one dark stripe on the side of the head, whereas *Anas superciliosa* has two.

The middle of the forehead, crown of the head, and a line down the back of the neck, are dark brown; from the bill to the eye, and thence to the occiput, is a brown line, which is separated from the crown of the head by a broad stripe, which is of a pale rufous tint; the cheeks, sides of the neck, chin, and upper part of the throat, are of the same colour; the whole of the body is brown, becoming gradually darker on the rump and tail feathers: all the feathers on the upper parts are edged with pale rufous; the wing coverts are crossed by a narrow white band near their extremity, and terminate in a deep velvet-like black colour; the *speculum* is deep glossy green, with purple reflections, and bounded behind by velvety black; to this succeeds a narrow white line: the bill and feet are apparently dark olive.

To this species Mr. Fraser applies the name *Luzonica*: it may be thus characterized:

ANAS LUZONICA. *An. supra cinereo-fusca, vertice nigrescenti-fusco; strigâ super oculari, genis, et gutture, pallidè castaneis; speculo alarum purpureo-virescente, anticè et posticè nigro marginato; corpore subtùs fuscescenti-cinereo.*

Long. tot. 21 unc.; *rostri*, $2\frac{1}{4}$; *alæ*, $8\frac{3}{4}$; *caudæ*, $4\frac{1}{2}$; *tarsi*, $1\frac{1}{2}$.

A collection of Birds from South Australia was exhibited. This collection, recently presented to the Society by the South Australian Company, contains the following species:—

Falco melanogenys, Gould. Native name, *Monkah*.

Falco Berigora, Vig. et Horsf. Native name, *Car-cown*, ya.

Falco Cenchroides, *Cenchris Cenchroides*, Gould. Native name, *Monne-monnie*; Golden Hawk.

Athene fortis, Gould. Native name, *Ounda-y-papa*.

Egotheles lunulata, Jard. et Selb. Native name, *Na-nie*; Night Hawk, or Eve-jar of the colonists.

Dacelo gigantea, Leach. Native name, *Cracow-Kata*; Laughing-Jackass of the colonists.

Graucalus melanops, Vig. et Horsf. Native name, *Ora*.

Cracticus hypoleucus, Gould. Native name, *Corow-Raw*; Whistling Magpie of the colonists.

Platycercus Pennantii, Vig. Native name, *Na-kall-ya*; Rosetta Parrot of the colonists.

Nanodes undulatus, Vig. et Horsf. Native name, *Tir-cou-ce*; Scalp Parrot of the colonists.

Trichoglossus concinnus, Vig. et Horsf.

Trichoglossus purpureus. Native name, *Warrow-Ka*.

Meliphaga Novæ-Hollandiæ, Vig. et Horsf. Native name, *Wandow*.

Anthochæra rufogularis. *Acanthegonys rufogularis*, Gould.

Sitella melanocephala, Gould. Native name, *Coolta-tacoow*.

Coturnix Australis, Temm. Native name, *Tou-ta-wa-tee*.

Coturnix pectoralis, Gould. Native name, *Tou-ta-wa-tee*. This is no doubt the male of the preceding species.

Charadrius nigrifrons. *Ægialitis nigrifrons*, Gould.

Rallus Philippinensis, Less. Native name, *Eerncou*; Land-Rail of the colonists.

Porphyrio melanotus, Temm. Native name, *Cow-oue*; Bald Coot of the colonists.

Nycticorax Caledonicus, Less.

Anas superciliosa, Gmel. Native name, *Tow-an-du*?

Rhynchaspis Rhyncotis, Steph.

Cygnus atratus, Shaw.

Phalacrocorax Carboïdes, Gould. Native name, *Yal-tow*; Black Shag of the colonists.

Mr. Fraser, who brought these birds severally under the notice of the meeting, and who at the same time furnished the above list, observed that the chief interest attached to this collection consisted in the locality in which it was formed, as naturalists were no doubt anxious to learn the geographical ranges of the Australian birds.

July 23, 1839.—William Yarrell, Esq., Vice-President in the Chair.

A collection of 68 Bird-skins, made by Capt. Belcher on the west coast of South America, and presented to the Society by the Lords Commissioners of the Admiralty, was exhibited, and commented on by Mr. Vigors.

Among other observations, Mr. Vigors directed the attention of the Society to typical or leading characters, of the various groups of which specimens were found in the collection; and pointed out the relations which subsist between the great primary groups of his own system of ornithology, and the different situations they are fitted to occupy,—the earth, the water, the air, the forests, and the marshes. Mr. Vigors afterwards went over the collection in detail, and made many interesting observations respecting the habits and relations of the different species.

Mr. Ogilby called attention to a new species of Squirrel sent from the west coast of South America, by Capt. Belcher, at the same time as the bird-skins noticed by Mr. Vigors. This species more nearly resembles the Coquallin of Buffon (*S. variegatus*, Gmel.) than any

other with which I am acquainted. It is, however, much smaller; rather less indeed than the common European Squirrel, and differs both in the colours themselves and in their distribution. The whole upper surface of the head and nape, as well as the cheeks of the Coquallin, are intense and uniform black; the ears and muzzle are pure white; the black and light-yellowish brown colours of the back are finely intermixed, or as it were granulated, whilst the long hairs of the tail are yellowish red at the roots, glossy black in the middle, and intense red on the terminal portion. In the new species, on the contrary, the head, muzzle, cheeks, and neck, are of the same colour as the back; the ears are but thinly covered with short hair, and that of a sandy red colour, surrounded by a narrow black border, most conspicuous in front; the back colours are brindled, or mixed in wavy irregular patches, and the long hairs of the tail are mostly black, terminated by snowy-white tips, which give the whole organ a hoary appearance; many of these hairs, however, have yellowish gray roots. The limbs and under-surface of the body, in both species, are red, but in the present species it is of a lighter and more yellowish cast.

For this species Mr. Ogilby proposed the name *variegatoides*: its chief characters are as follow:

SCIURUS VARIEGATOIDES. *Sc. supra fulvo nigroque variegatus; subtus helvolus; caudā longā, cylindricā, floccosā, canescente; auriculis imberbibus, subrufis, nigro marginatis.*

	unc. lin.
Longitudo ab apice rostri ad caudæ basin . .	10 0
———— caudæ	11 0
———— tarsi digitorumque	2 6
———— auris	0 9
———— ab apice rostri ad basin auris. . .	2 1½

A new species of Squirrel, sent by Hugh Cumings, Esq., Corresponding Member, from one of the Philippine Islands, was thus characterized by Mr. Waterhouse:

SCIURUS PHILIPPINENSIS. *Sc. supra intensè fuscus, pilis nigri-rufescenti-flavo annulatis, subtus cinerescenti-albus, capite et anticis pedibus cinerescentibus; auribus parvulis; caudā mediocri.*

	unc. lin.
Longitudo ab apice rostri ad caudæ basin. . .	6 6
———— caudæ	6 3
———— ab apice rostri ad basin auris . . .	1 6
———— tarsi digitorumque	1 9
———— auris	0 3½

Hab. Mindanado.

"This species is rather larger than *Sc. Palmarum*, and less than *Sc. bivittatus*. The general hue of the upper parts, sides of the

body, and outer side of the hinder legs, is deep brown (a much richer and deeper colour than the same parts in *Sc. bivittatus*): this tint is produced by the admixture of rust colour and black, the hairs being of the latter colour, and rather broadly annulated with rusty-red near the apex. The tail is not very bushy; the hairs are black, with two bright rusty bars. The under parts of the body are grayish white, with a faint yellow tint: the head and fore legs are grayish, and the feet are black, slightly grizzled with rust colour."

Mr. Waterhouse then proceeded to point out certain differences observable in the skulls of two species of Squirrels, which are usually confounded under the name *Sciurus Palmarum*, and the external characters of which he had pointed out in the "Magazine of Natural History" for September 1837, p. 496. The specific name *tristriatus* is there proposed for the new species.

"The skull of *Sciurus tristriatus*," observes Mr. Waterhouse, "differs from that of *Sc. Palmarum* in being a little larger, considerably broader in proportion, and in having the upper surface less convex; the post-orbital process is larger, the width between the orbits is greater, and the nasal portion is more suddenly contracted; the nasal bones are larger, and narrower posteriorly. Following are the dimensions of the crania of these two species of Squirrel."

	<i>Sc. Palmarum.</i>		<i>Sc. tristriatus.</i>	
	unc.	lin.	unc.	lin.
Total length	1	6	1	7½
Width		10½		11½
—— between orbits		5½		6½
Length of nasal bones		5½		6
From outer side of incisors (upper jaw) } to front molar tooth		5		5½
Space occupied by the five molars on } either side of upper jaw		3½		4½
Length of palate		7½		9
—— of ramus of lower jaw from } front to posterior part of condyle ..		10½	1	0½

MICROSCOPICAL SOCIETY.

The Microscopical Society of London, held their first Meeting on Wednesday, January 29th, at the Horticultural Society's Rooms, No. 21, Regent Street. The meeting was attended by upwards of a hundred members and visitors.

The President Professor Owen, announced that since the provisional meeting on the 20th of December, for the purpose of forming the Society, the number of members had increased to one hundred and ten, and a further addition of twenty-nine names was announced in the course of the evening, making a total of one hundred and

thirty-nine original members of the Society, it having been determined that those who joined the Society on or before the first night of meeting should be considered original members.

Mr. Owen communicated a paper on the application of Microscopic examinations of the structure of teeth to the determination of fossil remains. After alluding to the essential service rendered by the microscope to the chemist, mineralogist, and vegetable physiologist, he proceeded to offer a few examples of the utility of the microscope to the geologist, when applied to the investigation of the structure of fossilized teeth.

The first example adduced was that of the *Saurocephalus*, an American fossil animal which had been referred to the class of reptiles. After pointing out the destructive characters of the microscopic texture of the teeth in reptiles and fishes, it was shown that the *Saurocephalus*, according to this test, unquestionably belonged to the latter class, and that it most closely resembled *Sphyræna* among recent fishes in its dental structure.

The second instance was the *Basilosaurus* of Dr. Harlan, which had been referred to the class Reptilia; and the double-fanged structure of its teeth, had, on the strength of its supposed Saurian affinities, been adduced to weaken the arguments advanced in favour of the mammiferous nature of certain fossils from the Stonesfield oolite. Mr. Owen, after describing the microscopic character of the teeth of the *Basilosaurus*, showed that it deviated from the Saurian structure in this respect as widely as the *Saurocephalus*, but that the modification of its dental structure resembled most closely that of the cachalot and herbivorous Cetacea. Lastly, Mr. Owen alluded to the difference in the views entertained by Cuvier and M. de Blainville, as to the affinities of the megatherium, which was referred by the one to the family of the Sloths, and by the other to that of the Armadillos: after explaining the well-marked differences in the microscopic characters of the dental structure in these two families of the so-called Edentata, Mr. Owen proceeded to describe the structure of the teeth of the megatherium, and to show that in its close resemblance to the dental structure of the sloths, it confirmed the views of the great founder of the science of fossil remains. This paper was accompanied by a number of very beautiful illustrative drawings, exhibiting the minute structure of the teeth of the animals referred to.

Mr. Jackson then read a short paper drawing the attention of the Society to a mode of mounting the compound microscope, which differs in some particulars from the methods generally adopted. The principal object to be kept in view in the construction of the

instrument, is the prevention of those accidental vibrations which so much interfere with microscopic examinations, especially in the neighbourhood of crowded thoroughfares. This object is effected by connecting together the body and stage of the instrument in such a manner, that whatever vibrations are communicated to the one shall be equally communicated to the other. In the instrument of Mr. Jackson this principle has been carried further than has hitherto been effected; and it also affords improved facilities for minute adjustments, and the accurate admeasurement of microscopic objects.

A discussion ensued on the subject of Mr. Jackson's paper, and also on the best methods of measuring microscopic objects, and the greater difficulties encountered in ascertaining the antero-posterior diameters of minute bodies, as compared with the facilities which we possess of obtaining lateral measurements. The meeting then resolved itself into a conversazione, during which a number of interesting objects were exhibited by individual members, many of whom had their microscopes upon the table.

The meeting adjourned at 11 o'clock.

Wednesday, February 19, 1840, R. H. Solly, Esq. in the Chair.

A paper was read by Mr. Quekett, on the development of the vascular tissue of plants, in which it was shown that the membranous tube of vessels originated from a cytoblast in a manner similar to that described by Schleiden in the formation of cells*, from which at first it is difficult to recognise them; but in a short time they assume a very elongated form, and the cytoblast disappears. Before the fibre is deposited, the contents, which are gelatinous, are crowded with numerous most minute granules, which possess the motion known as "active molecules," and after a short time when they have become a little enlarged, they adhere to the inner surface of the tube containing them in a different manner for each vessel, so that the several varieties of vascular tissue are not degenerations of each other, but are each constructed originally on the plan they are always observed to present to the eye.

It had been conjectured by Schleiden that a current existed between the gelatinous contents of the cell and its walls, which preceded the formation of a fibre and gave the direction it afterwards took; this was refuted by showing that the granules become separately attached to the inside of the vessel, a little distance from each other, beginning first at one end and proceeding to the opposite; the fibre elongating like a root, by the materials of growth being

* See Taylor's Scientific Memoirs, vol. ii. p. 281.

always added to the point. The granules so attached, becoming nourished by the contents of the vessel, and the spaces between them, are in a short time obliterated by the fibre acquiring a defined border which completes its development.

This act is the one observed in the formation of the fibre of all vessels, but the arrangement of the granules differs so as to constitute the several varieties. In the annular vessel the granules attach themselves horizontally, forming rings. In the spiral they become inclined, and by continuing this direction around the interior of the membranous tube, the peculiar character of the vessel is obtained. In the reticulated, each division or branch of the fibre or granule becomes enlarged in the line, and forms the starting-place for the fresh direction of the fibre. In the dotted and scalariform vessels, the fibres become so reticulated as to have portions of the outer membrane of the vessel without any deposit within; and this spot, so left, constitutes the dot or linear marking seen in these vessels.

This dot is plain in all such vessels, excepting those found in woody exogens, where it possesses (from a slight difference in structure) a central mark analogous to that on the woody tissue of coniferous plants with which Mr. Quekett considers it identical, but only of a smaller size. The paper was illustrated with numerous diagrams, which gave representations of the successive stages of the minute process Mr. Quekett had observed.

ROYAL IRISH ACADEMY.

November 11, 1839.—Mr. Ball read a paper “on the *Bolina Hibernica*,” by Robert Patterson, Esq., Member of the Natural History Society of Belfast.

In a note appended to his paper on the *Cydidippe Pomiformis*, (Trans. R. I. A., vol. xix., part 1, page 96,) the author had mentioned the occurrence on the Irish coast of a species of ciliograde, which he had named provisionally *Bolina Hibernica*. A large number having been taken in the bay of Bangor, county of Down, on the 11th of July, 1839, the drawings now brought forward were executed from living specimens.

The movement of this Beroë was stated to be less vivacious than that of the *Cydidippe Pomiformis*, and it is much more susceptible of external injury. The long-continued action of certain portions of the cilia, after the animal was broken to pieces, was mentioned; the variety of aspect presented by the tentacula described; and the situation of certain whitish cords or vessels minutely detailed. The lobes of the mouth were shown by the figures not to occupy more

than one-fifth of the entire length. The body is transparent, and, when agitated in the dark, becomes highly luminous—a property not possessed after death.

In conclusion, the author enumerated the localities in which it had been hitherto observed, and proposed some brief specific characters by which it might be distinguished.

November 30.—Mr. Ball read a paper “on a Species of *Loligo*, found on the Shore of Dublin Bay,” about three years ago. Its dimensions are the following :—

Extreme length, to the end of tentacula, 10·0 inches.

Do. of the body or mantle, 3·1 „

Do. of the head, 1·6 „

Average length of arms, 2·8 „

Length of tentacula, 6·0 „

Breadth of fin, 3·0 „

Length of fin, 1·3 „

Extreme breadth of body, 1·7 „

Length of dorsal lamina, 3·5 „

Extreme breadth of dorsal lamina, 0·2 „

Breadth of largest horny hoops of acetabula about 0·2 „

It was thus shown to be of much shorter proportions than the *Loligo vulgaris*. Its body is urn-shaped. The large fin, which is somewhat inequilateral, approximates to an ellipse in form, and resembles, not a little the fin of *Loligo Brongnartii*, as figured by Ferussac, to which it also bears likeness, in the structure of its five-ribbed dorsal lamina; but it differs from this animal in its general proportions, and in the horny hoops of its acetabula, which have in each of the twelve largest in the tentacula about thirty-six sharp and equal teeth. The general form of the whole animal much resembles *Onychoteuthis Leachii*—a cephalopod of a different genus, with which it may be confounded by a casual observer. Mr. Ball proposes to name the species *Loligo Eblanæ**.

In addition to the foregoing, the following species of *Loligo* have fallen under Mr. Ball's notice, as occurring in the Irish seas :—

Soligo sagittata, var. differing in the shortness of its tentacula from the figure given by Ferussac. Several specimens were taken off the coast of Cork by George Allman, Esq.

Loligo vulgaris.

Loligo media.

* The ancient name of Dublin.

Loligo media, var.—easily distinguished by its greater proportionate length of body, and by the shortness of its tentacula, from the true *L. Media*; in the form of the fin ternating its mantle, it strongly resembles *Loligo subulata*. A few specimens, obtained on the coast of Down by the late J. Montgomery, Esq., were submitted to Mr. Ball's inspection by W. Thompson, Esq.*

December 9.—Mr. Lloyd exhibited a specimen of the Vegetable Flannel described in p. 359 of our 4th volume, brought by him from Berlin. He at the same time laid on the table of the Academy a specimen of a very similar substance, which he had received from Sir John Herschel, and which was found investing the rocks at the mouth of one of the rivers of Southern Africa. It resembles the other very much in external appearance, except that the fibres are coarser, and more compactly matted together. It appears to consist almost entirely of *confervæ*, but apparently of a different species.

MISCELLANEOUS.

ON *DATISCA CANNABINA* AND IMPREGNATION.

Dr. Fresenius has observed that in *Datisca cannabina*, when female plants remain isolated, they are able nevertheless to produce ripe fruit in abundance; and he thinks he is justified in concluding that this and other purely female forms are, in the absence of male organs, endowed with the capability of developing, by a purely vegetative process, the highest vital product, the terminal bud. In the summer of 1837 a female specimen of the above plant in the Frankfort botanical garden, developed a stem from its root which now bears male flowers also.—*Linnaea*, Part III. 1839.

ON A NEW GENUS OF CEPHALOPODA.

M. Eschricht has given in the Transactions of the Academy of Copenhagen a description of a highly remarkable Cephalopod from Jacobshavn, in Greenland, as a new genus, under the name *Cirro-teuthis Mülleri*, with the following character: "Octopus sutoriiis minimis unam seriem in quovis brachio formantibus; brachiis cir-

* Since the foregoing was written, Mr. Ball was favoured with an inspection of Cuttle-fish bones, found at different times on Magilligan Strand, county of Derry, by Mr. Hyndman, of Belfast. They seem to be those of *Sepia rupellaria*, figured in Ferussac's third plate of *Sepia*. His attention was also directed to beaks of Cuttle-fish, found in the stomachs of *Delphinus melas* and *Hyperoodon bidens*. They belonged to a species of Cephalopod he has not yet determined. As he purposes writing a monograph of the Cephalopoda of the Irish seas, he requests information on the subject from all who can afford it.

ratis et cum membrana natatoria vel cum plicis ejus pendulinis usque ad apicem fere connatis; alis natatoriis duabus transversalibus, vertebræ cartilagineæ corporis insertis. Suctoriis singulorum brachiorum 30, cirris 32." Length of body $3\frac{3}{4}$ "; of the arms $4\frac{1}{2}$ ".—*Wiegmann's Archiv*, Part V. 1839. Berlin, 1840.

DERIVATION OF THE *TEFF* AND THE *TOCUSO*, TWO SPECIES OF
ABYSSINIAN GRASSES.

The cultivation of the seed of the Teff, brought to Europe by Rüppel, has shown that this grass is the *Poa abyssinica*, Jacq.* and that the drawing of Bruce, although somewhat rude, is also to be referred to the same plant. The Tocusso, which Bruce likewise mentions, is, according to the specimens cultivated from Rüppel's seed, an *Eleusine*, very similar to *El. indica*, but yet forming a new species, *Eleusine Tocusso*. This grass is principally cultivated on hills, for the brewing of beer.—*Linnaea*, Part III. 1839.

THE SNAKE NUT.

This extraordinary vegetable curiosity is a nut about the size of an ordinary walnut, nearly round, and of a fine brown hazel colour, and very light. When broken, the kernel is found to bear so striking a resemblance to a snake that it is always called the *snake nut*. It grows in the marshes of British Guiana. Had we only examined one specimen we should have taken it for a *lusus naturæ*,—a merely accidental resemblance to the snake, assumed by the kernel in shrinking; but the gentleman who favoured us with a sight of it has several of the nuts, and they are all alike, which circumstance, together with the name which has been given to it in the country where it is produced, proves that it is not a mere freak of nature, but a regular natural production. We do not recollect ever having heard or read of the species of nut which we have here briefly described, and if any of our readers can, and will, throw some light on the subject, we shall be much obliged for the information. The specimens of the snake nut which we have seen were brought home by the Palmyra which arrived lately in this port from Demerara.—*Liverpool Mercury*, Jan. 17.

The unknown Correspondent from whom we have received the above is informed that a Description and Drawing of the Snake Nut was communicated by Mr. Schomburgk to the Linnæan Society, in June, 1837.

* The identity of the plant produced from the seeds brought home by Bruce under the name of *Tef*, with the *Poa Abyssinica* of Jacquin, was pointed out by Solander in 1789, in the first edition of "*Hortus Kewensis*," vol. 1, p. 100. But Bruce's figure, making every allowance for its rudeness, cannot possibly be referred to the same grass.

M. VON HUMBOLDT ON DARWIN'S VOYAGE, AND ON SCHOMBURGK'S EXPEDITION.

"The volume of Mr. Charles Darwin is an admirable Supplement to the voyage of the *Beagle*: it is one of the most remarkable works that, in the course of a long life, I have had the pleasure to see published. Mr. Darwin unites to sagacity for detailed observations enlarged views in general physics, I should rather say in natural philosophy—views which embrace at once geology, the geographical distribution of plants, and the influence of temperature on the organic types of the primitive world."

"Mr. Schomburgk continues to explore with the same ardour. I hope that he will reach the Cerro Duida, the forest of *Bertholletia*, and the mission of Esmeralda, where I was almost devoured by mosquitoes. May this excellent young man, my countryman, always enjoy the kindness of your illustrious Society!"—*Letter of M. von Humboldt in the Transactions of the Geographical Society*, vol. ix. p. 50.

METEOROLOGICAL OBSERVATIONS FOR JAN., 1840.

Chiswick.—Jan. 1. Overcast: fine. 2. Very fine. 3. Fine: slight rain. 4. Rain. 5. Cloudy and fine: frosty at night. 6. Frosty. 7. Clear and frosty: severe frost at night. 8. Severe frost. 9. Overcast: fine. 10. Overcast: frosty at night. 11. Sharp frost. 12. Frosty: fine. 13. Clear. 14. Hazy. 15. Drizzly. 16. Fine. 17. Foggy. 18. Frosty and foggy: rain. 19. Boisterous, with heavy rain. 20. Rain: fine: boisterous at night. 21. Very boisterous with rain. 22. Cloudy: clear at night. 23. Rain: windy at night. 24. Boisterous. 25. Overcast: rain: fine. 26. Stormy and wet. 27. Clear and cold. 28. Rain: boisterous. 29. Very fine. 30. Hazy. 31. Very fine.

The frost was, for a short time, very intense between the 7th and 8th, being 20° below freezing.

Boston.—Jan. 1. Cloudy. 2. Fine. 3, 4. Cloudy. 5. Fine. 6. Fine: little snow P.M. 7. Fine. 8, 9, 10. Cloudy. 11, 12, 13. Fine. 14, 15. Cloudy. 16. Fine. 17. Rain. 18. Cloudy. 19, 20. Cloudy: stormy with rain P.M. 21. Stormy: thunder and forked lightning with rain A.M. 22. Cloudy. 23. Rain. 24. Stormy: rain P.M. 25. Fine: snow A.M. 26. Rain: rain early A.M. 27. Fine. 28, 29. Rain. 30. Fine. 31. Cloudy: rain early A.M.

Applegarth Manse, Dumfries-shire.—Jan. 1. Fine morning: rain P.M. 2. Very wet A.M.: showery all day. 3. Quiet day with slight showers. 4. Fine day and fair: aurora borealis. 5. Clear day: hard frost. 6. Fine frosty day. 7. Dull and cloudy. 8. The same: thaw. 9. Frost again. 10. Still frosty but cloudy. 11. Wet and stormy. 12. The same all day. 13. Fair, but threatening rain. 14, 15, 16. Wet and boisterous. 17. Clear and tending to frost. 18. Rain again and wind. 19. Heavy rain A.M.: showery all day. 20. Frequent showers. 21. Wind very high. 22, 23, 24. Boisterous weather. 25. The same: slight showers. 26. Moderate but showery. 27. Succession of snow showers. 28. Frost A.M.: snow: thaw P.M. 29. Frost A.M.: fine winter day. 30. Frost early A.M.: change P.M. 31. Slight showers A.M.: fine day.

Sun shone out 22 days. Rain fell 18 days. Snow 2 days. Frost 7 days.

Wind north 1½ day. North-east 5½ days. East 1 day. South-east 5 days. South 3 days. South-west 9½ days. West 4 days. North-west 1½ day.

Calm 8 days. Moderate 5 days. Brisk 3 days. Strong breeze 9 days. Boisterous 5 days. Storm 1 day. Temperature of spring water, taken 3 times in the month, 43°·3. Mean temperature of the atmosphere 37·8.

Days of Month. 1840.	Barometer.				Thermometer.						Wind.				Rain.				Dew point. Lond.: Roy. Soc. 9 a.m.
	London: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire. 9 a.m.		London: Roy. Soc. Fah. Self-register.		Chiswick.		Dumfries-shire.		London: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Wind.	Rain.	
		Max.	Min.		9 a.m.	8½ p.m.	Fah.	Min.	Max.	Min.	Max.	Min.								Max.	Min.
Jan.																			
1.	29.724	29.944	29.699	29.30	29.46	29.35	49.8	50.5	44.3	55	46	51	44	39	s.	calm	E by S.	..	44
2.	29.738	29.941	29.757	29.21	29.25	29.41	47.6	48.0	47.6	52	39	47	47	42½	sw.	sw.	sw.	..	43
3.	30.000	29.999	29.924	29.47	29.73	29.95	43.2	43.6	41.8	46	40	43	45	42	sw.	calm	W-N.	..	40
4.	29.956	29.975	29.908	29.60	29.90	29.89	39.7	40.6	40.6	44	32	38	39	32	ne.	calm	ne.	..	40
5.	29.896	29.968	29.902	29.52	29.84	29.87	36.3	36.6	36.7	40	24	30	35½	27½	n.	calm	N.	..	37
6.	30.000	30.253	30.000	29.60	29.99	30.18	33.6	34.0	31.5	38	19	31	34	27½	nw.	calm	ne.	0.60	32
7.	30.282	30.313	30.259	29.92	30.10	29.98	29.0	32.0	29.0	32	12	27	32	19½	ene.	calm	ne.	..	28
8.	30.156	30.219	30.182	29.73	29.93	30.03	22.8	22.4	22.3	32	26	31	38	29	sw.	calm	nw.	..	17
9.	30.224	30.389	30.264	29.80	30.09	30.21	33.2	32.8	22.3	37	29	55	35	27	sw.	calm	ne.	..	28
10.	30.476	30.588	30.511	30.20	30.26	30.25	27.4	34.8	32.6	35	15	33½	34½	25	e.	calm	sw.	..	26
11.	30.516	30.557	30.413	30.13	30.14	30.07	27.4	37.2	26.0	37	17	26	41½	34	se.	calm	sse.	..	27
12.	30.286	30.352	30.288	29.85	29.85	29.87	31.5	35.3	27.3	42	22	27	44	38	se.	s.	s.	..	27
13.	30.144	30.192	30.003	29.83	29.71	29.47	34.9	39.8	31.4	40	29	31	45	42	se.	s.	se.	..	28
14.	29.924	30.078	29.944	29.55	29.54	29.68	40.9	41.5	34.8	46	41	37	46	41½	ssw.	se.	se.	0.20	33
15.	30.142	30.131	29.879	29.70	29.36	29.36	43.2	44.7	40.2	46	38	43	46½	43	sw.	w.	w.	..	39
16.	29.718	29.797	29.760	29.23	29.30	29.39	40.7	46.8	40.8	43	36	40	46½	40	sw.	w.	w.	..	39
17.	29.490	29.858	29.518	29.18	29.42	29.71	41.5	46.6	40.8	43	24	39	42	35	s.	ne.	nne.	..	40
18.	29.972	29.990	29.726	29.54	29.43	29.28	36.3	43.8	34.2	50	40	33½	49½	28	s.	calm	sw.	..	36
19.	29.436	29.697	29.358	28.84	28.88	28.80	49.4	50.7	35.6	54	40	46	46½	41	s.	calm	sw.	..	44
20.	29.618	29.712	29.425	29.15	29.20	29.03	42.6	54.2	41.4	54	44	42½	42½	36	s.	calm	ws.	..	41
21.	29.312	29.726	29.325	28.73	28.73	29.05	51.3	53.7	41.4	52	43	51	44	35½	s.	w.	w by S.	..	45
22.	29.684	29.838	29.652	29.10	29.22	29.45	48.3	53.2	45.0	51	38	47	44	37½	s.	w.	w.	2.40	43
23.	29.808	29.841	29.622	29.25	29.10	29.05	47.7	51.4	41.2	54	49	41.5	49	35½	s. var.	w.	s.	..	41
24.	29.346	29.366	29.100	28.73	28.78	28.41	52.0	53.5	47.4	53	37	55	49	40	s. var.	s.	ssw.	..	47
25.	29.316	29.382	29.352	28.76	28.77	28.95	43.0	53.3	39.6	54	38	39	39	36	s.	w.	sw.	..	42
26.	28.938	29.311	28.742	28.43	28.44	28.62	50.5	52.7	40.6	52	34	48	44½	35½	s. var.	w.	ws.	..	45
27.	29.444	29.758	29.499	28.91	29.00	29.28	37.8	38.5	37.0	46	35	36	39½	29½	sw.	w.	w.	..	38
28.	29.422	29.427	29.182	29.05	29.05	28.85	42.8	43.4	37.0	54	42	36	37½	32	s.	calm	sw.	1.41	40
29.	29.500	29.830	29.562	29.15	29.35	29.54	44.8	45.5	42.6	47	26	37	39½	33	w.	n.	ws.	..	41
30.	29.938	29.962	29.685	29.53	29.30	29.45	34.4	35.0	34.6	45	30	34	39	27	ssw.	e.	se.	..	36
31.	29.574	29.584	29.539	29.15	29.20	29.30	43.4	44.3	34.8	50	29	41	42	33½	s.	s.	sse.	..	40
Mean.	29.806	29.931	29.732	29.36	29.440	29.474	40.4	43.5	36.9	45.9	32.6	38.6	42.3	34.3	2.48	4.61	Sum. 2.633	1.25	Mean. 37.0

ANNALS OF NATURAL HISTORY.

IX.—*On the Structure of the Cellular Membrane in Mosses and Hepaticæ.* By Dr. M. J. SCHLEIDEN*.

It is doubtless an interesting subject of inquiry how far the cell agrees in all plants in its vital phænomena, and how far we are thence justified in coming to the conclusion that the vegetable cell is in all cases one and the same physiological element. For this purpose detached remarks are not without value, and their proper place will be assigned to the following statements. If anything already known should be found amongst them, it may be passed over. In the deluge of botanical literature it is no longer possible, even with the best helps, immediately and accurately to become acquainted in detail with everything new; and, indeed, when I noted down this observation I had no library at hand.

One of the most important and characteristic events in the vital phænomena connected with cellular tissue, is the thickening of the membrane by a deposition of layers, the original spiral arrangement of which will soon, it is to be hoped, be universally established beyond doubt. Great importance has already been attributed to spiral formations, but the consequence resulting from them was too partially comprehended, inasmuch as the porous kinds of tissue were excluded, though these in reality are formed according to the same law. Now if after so many new inquiries the idea must be proposed, nay more, admitted, that we possess in the spiral formation an elementary organ distinct from and opposite to the cellular system,—that the spiral formation, including porous tissue, is altogether but a characteristic portion of the vital process of the cell,—so will this afford the means of determining whether or not under the notion of cells are comprehended elements of different importance. Where we find similar stages of de-

* Wiegmann's Archiv für Naturgesch. V. Jahrg. Part IV. p. 277.

velopment we shall always obtain a valid ground for admitting the identity of the elements, and thence we shall also be justified in assigning other occurrences in the life of the cell of plants by analogy to those cells in which they have not yet been expressly observed.

So far as I am aware, up to the present time the occurrence of a spiral formation has been ascertained in the reproductive organs of *Hepaticæ* only in the elaters and fruit valves*. But these are not less strikingly developed in the vegetative organs of *Marchantiaceæ*. The parenchyma of the leaf in *Marchantia polymorpha* and *Fegatella conica* consists almost entirely of cells, the partitions of which appear most distinctly porous or (especially in *M. polymorpha*.) thickened beautifully with network. This thickening of the cell partitions takes place to so great a degree in the older parts and in the proximity of the midrib, that by transverse sections the pore-channels may be plainly recognised.

Amongst mosses, the true *Dicrana*, for example *D. Schraderi*, *spurium*, &c. are distinguished by leaf-cells, of which the sides are very thick and the partitions evidently pierced through, frequently by very wide, frequently by funnel-shaped pore-channels, just as is apparent in the epidermis of so many phanerogamous plants. And still more conspicuously do these spiral and porous formations display themselves in *Sphagneæ*, and in the nearly related group of *Leucophaneæ* established by Hampe. The structure of the cells of *Sphagnum*, *Leucobryum vulgare*, Hampe, (*Dicranum glaucum*) and *Octoblepharum albidum*, seems to me to have been sufficiently discussed by Mohl; here therefore I can only add some inconsiderable contributions. Those peculiar and large pores which in the older state of the leaf become real holes (just as in the partitions which separate the vessels of phanerogamous plants), besides being found in the species above-mentioned, also occur in *Octoblepharum cylindricum*, Schimp. *Didymodon sphagnoides*, Hook., and in *Leucobryum minus*, *albidum*, and *longifolium*, Hampe†. All the mosses reckoned amongst *Leuco-*

* Beautiful and interesting forms are especially met with here in *Pellia epiphylla*.

† The determination of these mosses is to be depended on, as they were all communicated to me, with his accustomed kindness, by Hampe himself.

phanææ by Hampe are characterized, just as in the *Sphagneæ*, by peculiarities in the structure of the leaf, which consists of two different species of cells, some narrow and filled with chlorophyll, others wider, transparent, and perforated with pores which afterwards pass into holes. The differences depend, with the exception of the structure of the sides of the cells, particularly upon the arrangement of these two species of cells. In *Sphagneæ* both lie more or less in one plane, and so form but one layer, of which the whole leaf consists; in *Leucophaneæ* the green cells are always covered on both sides with 1, 2, or 3 layers of the large transparent perforated cells. From this arrangement, by which the green cells are greatly obscured, results that glaucous colour which characterizes the whole tribe at first sight, together with its peculiar quickly drying and brittle as well as moist and flexible habits.

X.—On a minute Alga which colours Ballydrain Lake, in the county of Antrim. By WM. THOMPSON, Esq., Vice-Pres. Nat. Hist. Society of Belfast.

JULY 25, 1838.—Late in the autumn of 1837 I observed patches of a singular looking blueish green scum at the edge of Ballydrain Lake—a beautiful and picturesque sheet of water situated a few miles from Belfast*—but being hurried at the time, I did not procure specimens for examination. This I had intended to do a few days afterwards, but circumstances prevented its accomplishment at that time, and when I soon afterwards returned the plant had disappeared. On visiting

* Ballydrain Lake covers about twenty acres of a sandy and peaty soil, and its elevation above the sea is perhaps forty feet. It is of various depth, is fed by springs, and has an outlet in but one small brook. During winter it is the daily haunt of great numbers of wild fowl (*Anatidæ*) of various species, that resort to it as a secure asylum; and I am happy to say not in vain, for agreeably to the good taste of its proprietors, a shot is not permitted to be fired upon it; but, notwithstanding, these most attractive birds have been on the decrease for the last few years. In fishes, mollusca, or other plants than those here treated of (unless more microscopic species remain to be discovered), it possesses no peculiarities. *Myriophyllum*, buck-bean (*Menyanthes*), and the larger phenogamic plants generally, have much increased of late years, to the detriment of pike-fishing, the vegetation near the edges being so dense as to conceal the bait placed on night lines for the capture of these fish.

the lake today for the purpose of investigating this *Alga*, for to some minute tribe of this order of plants I was satisfied that the substance noticed did belong, I found that the whole body of water was tinged with a dull faintly glaucous hue. On going out in a boat to ascertain the cause of this appearance, I saw that the water was everywhere filled with extremely minute particles, which might be compared to the motes in a sun-beam. To the unassisted eye they seemed as delicate as the finest human hair and of a spiral form: with the aid of a lens they were seen to be a vegetable production. Around the boat, which was stationary, their motion was not very rapid, but those on the mere surface moved in an opposite direction from the particles beneath, and the latter the more quickly. Their present appearance, together with the recollection of the floating masses observed last autumn, at once brought to mind the *Oscillatoria ærugescens* discovered in 1837 by my friend Dr. J. L. Drummond in Glaslough (county of Monaghan*), and where, as in the present instance, that plant performs a similar part in giving a colour, &c. to the water. Until the microscope be resorted to, there seems indeed the strongest analogy between them, but this instrument proves that the alga under consideration does not belong to the genus *Oscillatoria*.

On inquiry from some relatives, whose demesne is situated on the borders of the lake, I learned that the appearance described had been observed only for the last four or five years, and for about three months in each year: one of my friends had looked upon its approach with dread, as it interfered so much with his angling that during the period of its continuance this sport had to be abandoned. Eels, pike, and perch, especially the latter, are abundant in the lake, but when the water is clouded by this plant, the diminution in the number of perch taken is said to be not less than about one to fifty—the difference is attributed to the fish being unable to see the bait. About the 1st of this month I am informed that the water was perfectly clear.

July 30.—I visited Ballydrain and found the entire lake tinged with this plant, but unequally so; in some parts, where

* See Annals Nat. Hist. vol. i.

the water was two feet deep, the bottom could be seen; in others it was invisible at one fourth of this depth: at the leeward and windward sides there was but little difference, except that at the latter it was occasionally observed to give a pale green tinge to the surface, where the water circling gently in, congregated it together and threw it thence in a broken cloudy form for a moment, when it was again dispersed: since the 25th I should say that it has increased by at least one third. The lake has at first sight the appearance which Dr. Drummond ascribed to Glaslough, of being "greened" by the reflection of trees: from eminences at some little distance the green tinge of the water is most conspicuous, and particularly so at the further side. In some places the colour is of a pale dull green, in others greenish brown; thus imparting to this fine sheet of water, in place of its wonted appearance of coolness and freshness, the dull dead aspect of a Dutch canal. When viewed at the distance of a few paces from the margin the plant is apparent during sunshine, as it likewise is at such times in water lifted in the hand*.

Sept. 16.—I again went to the lake, and found it to be much more densely coloured than on the 30th of July. The day being perfectly calm, the surface of the water was covered to some extent, where the depth appeared to be about five or six feet, with an alga of a pale but rich green hue. When attentively observed it was seen moving in currents presenting the form of what is technically called "the feather" in the most admired mahogany, now moving round a centre or "knot," and again diverging from it rapidly and in the most graceful forms, the water appearing through the moving masses of the plant so as to take the place of the darkest hues and knots in the wood. It was perhaps an appearance similar to this, that MM. Engelhardt and Treschel have described the *Oscillatoria rubescens*,—a minute alga which tinges with a red colour the lake of Morat in Switzerland,—occasionally to assume, when,

* A quantity of the alga brought home today in a phial of water remained scattered through it for twelve hours; in twenty-four it had all risen to the surface: in another instance it on the third day covered the bottom of the vessel.

to use their own words, it presents "figures assez semblables à celles produites par l'électricité positive sur l'électrophore*." In sheltered places there were floating pale blue tufts or small masses, such as I saw here last autumn; but endeavouring to secure them by carefully putting beneath a sheet of paper on which to lift them, I was surprised to find, that notwithstanding their apparent consistency, they floated off in the water with which they were brought up, not even leaving behind a tint of their colour. Some specimens from deep water, brought home today, when viewed under the microscope, exhibited precisely the appearance the plant did in July.

Sept. 26.—On visiting the lake this afternoon, which was fine, though dull and without sunshine, (as the earlier part of the day had been,) I remarked that the water generally had lost some degree of its opacity and looked clearer than on the 16th. Instead of the beautiful appearance which the surface presented upon that day, there was in some places merely a little scum, which excepting its very pale greenish tinge, resembled precisely the appearance remaining on the surface of water in which ice has been dissolved. Towards the edge of the lake, there were in some places, as on the 16th, gelatinous tufts of a pale blue colour; in one place crowded together in a mass which covered an area a few yards in extent. These were generally of greater consistence than on the 16th. The portion nearest the edge had, apparently from decay, become ferruginous, and strongly tinged with rust colour the paper on which it was placed, but with the greatest pains I could hardly obtain a trace of the blue colour. The masses, both blue and ferruginous, were very slippery to the touch, about an inch in thickness, and of considerable consistence, more so than sea-jellies or *Medusæ* generally are, or like that of an oyster; and on being lifted out of the water in a wire-gauze net, remained there without diminution by dripping off or otherwise: their weight too was great. When brought near they had somewhat of the offensive smell of water in which flax had been steeped, and at a short distance from one part of the lake this disagreeable odour was sensibly perceived.

* Mémoires Soc. Physiq. et d'Hist. Nat. de Genève, t. iii. part 2. p. 31.

Sept. 27.—I went out this morning (which was beautiful and with bright sunshine) soon after eight o'clock to observe this plant further, and from a greater display of it upon the surface than yesterday, considered that the heat of the sun might have attracted it thither. I had previously observed, that in perfectly calm weather, it, like the *Oscillatoria æruges-cens*, &c., is disposed to ascend to the surface; it was now evidently beginning to assume the graceful and attractive forms remarked on the 16th. By fixing a phial to my net and skimming the greenish surface with it, I ascertained to a certainty that this surface plant was of the species under consideration. In addition to what was mentioned yesterday of the water of the lake having lost some of its opacity, it may be stated, that where a foot in depth it now in some places is perfectly clear, but in others where it is from two to three feet, it appears when the sun shines upon it of a very pale blue; whether this be an optical deception or be owing to the plant in progress of decomposition, I cannot presume to state.

Oct. 7.—This plant and the *Aphanizomenon* (hereafter to be particularly noticed), both of which were obtained on the 27th Sept., have now entirely disappeared from the lake, the water throughout its depth as well as at the surface being clear and pure: since the day last named there has been no change of weather to produce this effect, the days having been uniformly warm and fine, and the nights with very little frost for this advanced period of the year.

The following additional notes were made in 1839.

July 3.—I was rowed all over the lake, and observed the alga dispersed throughout the entire water, but rather sparingly, and not to such an extent as to tinge or conceal the bottom in any place; it appeared like metallic points wherever the sun shone upon it; for some weeks it has been observed, and was first noticed about the 6th of June. On the present occasion I had the pleasure of being accompanied by P.J. Selby, Esq. and the Rev. Edward Bigge, of Merton College, Oxford.

Sept. 23.—The lake was quite clear, and in a few places the remains only of the blueish masses which indicate the disappearance of the plant for the season were visible, and these

were in sheltered spots in the midst of a flotilla of *Aphanizomenon*, which was still abundant in a few creeks.

Sept. 25.—With the desire that my friend Mr. W. H. Harvey, now in Dublin, should have the opportunity of investigating both plants in a *recent* state, I visited the lake in the hope of procuring them. The water looked perfectly clear as on the 23rd, but going into the boat I at once saw on looking down into the lake where the sun struck upon it, that the spiral alga was still there, though very sparingly; I brought some up in phials. The water was slightly agitated today and consequently none of the *Aphanizomenon* was obtained.

I have been thus particular in noting the observations on this plant just as they were made from time to time, chiefly to show that the species undergoes no change whatever either in size or otherwise from its first appearance as a colouring matter until about three months afterwards, when decomposition ensues and it is utterly dissolved. In consequence of the great changes that some species of *Algæ* do really undergo, and the conjectures of botanists that others which have not been investigated are likewise subject to them, I took much interest in attending to this point during the time that this alga plays such a prominent part in the waters of the lake.

On examining this plant when first obtained, I could only say that it did not belong to any British genus with which I was acquainted, and no further attention was then given to it. M. Morren, Professor of Botany in the University of Liège, and well known to have successfully studied the freshwater *Algæ* of Flanders, on his visit to Dublin in the following month (Aug. 1838) was shown some sketches of the plant which I had communicated to Miss Ball—a lady who has given much attention to the *Algæ* of Ireland, and made therein some interesting discoveries—and he referred them to the genus *Anabaina* of Bory St. Vincent. With the genus *Sphæroplea*, Ag., in its last or *free state*, my species would however as well agree as with *Anabaina*. Except in the specific difference of being much more minute and more regularly spiral, it resembles the *Sphæroplea crispa*, Berk.* in this state, but

* The specific characters of this species are—"Threads erect, short, green, mucous, crisp, simple, at first with articulations as broad as long, filled with minute distinct granules, then with parallel rings, which at length become

whether like that plant it be originally fixed I am unable to say.

As my species does not correspond with any *Anabaina* of Bory's, I venture to characterize it as follows :

Anabaina? spiralis, mihi. *A.* consisting of an extremely minute moniliform thread of a rich green colour, and regularly spiral like a corkscrew; globules of equal size throughout its entire length.

The specimens obtained were invariably of similar breadth and rarely presented more than four spiral turns, and when of this size were $\frac{1}{30}$ of an inch in length. The species at first, when mingling with the water, is of a dark green colour : when in calm weather it ascends to the surface in *separate* particles, it appears pale green ; when it does so *en masse* (the earliest symptom of decay), it is of a pale blue ; and in the last stage of decomposition, ferruginous. Having on the 27th Sept. brought home in several phials specimens of what I had presumed to be this plant in all its stages (i. e. from its first to last appearance as a colouring matter), I was much pleased to have the conjecture verified by microscopical examination. A portion taken from the surface when it appeared pale green, was under the microscope of as dark a hue as in July, whilst the blue and ferruginous colours exhibited different stages of decomposition. When in the most perfect state in which the plant has occurred to me, the globules appear entirely filled with granules, but when very highly magnified are each found to be surrounded by a hyaline membrane. The blue and ferruginous tufts exhibited generally the empty globules and the escaped granules scattered all about, but the former were seen in every state from full to empty : some had granules only in the centre, others were half-full, and some *separate* globules were entirely filled with the granular mass.

When two of the spiral portions come in contact, they have an elastic power, by which they can, though slowly, disentangle themselves and separate from each other,—a fact which

globular and escape in moniliform threads." It grows "on stones, aquatic plants, and the boards of sluices in early spring, forming a tuft of small crisped somewhat intricate bundles of filaments, of a beautiful deep green."
—Berkeley's 'Gleanings of British Algæ.'

I witnessed in various instances; but under such circumstances only did I ever perceive any motion in this alga*.

In some respects the *Anab. spiralis* resembles the *Anab. impalpabilis*, Bory, as described in the 'Encyclopédie Méthodique,' but its dull green unlustrious hue on paper is quite opposed to that of the species just named, which is described—"Préparé sur le papier, où on a facilité son développement, elle est de la teinte la plus brillante, tirant sur celle de l'oxide de cuivre, et luisante comme si on l'eut enduite d'eau de gomme." Besides, were this species of the *exact* spiral form of that under consideration, this character would not I conceive have been unnoticed in the description.

Anabaina flos-aquæ, Bory. *Byssus flos-aquæ*, L. This species may here be noticed, after having passed the judgement of my friend W. H. Harvey, Esq. It attracted my attention when tinging with its delicate green hue the margin of the smallest? of the lochs Maben in Dumfries-shire, or that nearest to Jardine Hall (on the road from the village of Lochmaben), as I drove thither on the 15th Aug. 1838; the day was calm and bright. My specimens tinge the paper with a verdigris colour, and are quite dull or wanting in any lustrous appearance. This species is introduced here on account of its having been erased of late years from the British Flora. Hudson and Lightfoot included it, but without assigning to it any British station or locality.

Aphanizomenon recurvum, Morren. On the 25th July 1838, I observed on the surface of sheltered creeks in Ballydrain Lake a very minute *Alga* having the appearance of powdered verdigris. On examining it after I had reached home, I could merely, as in the instance of the *Anabaina* procured on the

* Bory St. Vincent remarks of the genus *Anabaina*—"Leur mouvement offre un espèce de rapport avec ceux au moyen desquels ambulent les lombrics; ils sont progressifs, et les courbures qu'ils déterminent sont d'une extrême lenteur. C'est à l'aide de cette faculté ambulatoire que l'on voit surtout les espèces aquatiques s'élever à la surface de l'eau, le long des Conferes et des débris des végétaux, ramper à la surface des roseaux et des carex, pénétrer la vase et les Oscillaires, en les surmontant, ce que leur a mérité le nom tiré du grec, par lequel nous avons proposé de les désigner."—Ency. Method. This author ranked the *Anabainæ* in the animal kingdom.

same occasion, consider it as belonging to a genus that had not been recognised as British. Having preserved a quantity of the plant I communicated specimens to Dublin, where on the following month they were seen in Miss Ball's collection by Professor Morren, who was highly gratified to recognise them as the alga discovered by himself in Flanders, and for which he constituted a new genus—*Aphanizomenon*—that was announced to the Royal Academy of Brussels in the preceding month of December.

M. Morren observes in reference to this species—"Vers le milieu du mois de Mai jusqu'au mois de Juillet, on trouve des étangs, des mares, des bassins, qui environnent les maisons de campagne en Flandre, dont l'eau offre des flocons d'un vert blanchâtre et de la grosseur qui varie de celle d'un petit pois à celle d'un melon. Ces flocons, qui paraissent nageux de loin, sont placés à distance les uns des autres; on les dirait immobiles, mais vus de plus près, ils jouissent d'une véritable locomotilité, qui permet de les rencontrer à toutes les hauteurs dans l'eau. J'en ai observé cette année encore, prodigieuse quantité à Gentbrugge, près de Gand."

In Ballydrain Lake I have, both in 1838 and 1839, remarked its presence in very calm days, for it is only at such times visible, during the months of July, August, and September, and then it appears in the most sheltered creeks only, floating in patches of various dimensions.

Under the separate heads of "Organologie" and "Physiologie de l'Aphanizomène," highly interesting details, which I must content myself with referring to, will be found in M. Morren's Memoir; as however this may not be accessible to all British botanists, it seems to me desirable that the following at least should be copied from it*.

"APHANIZOMENON†.

Filamenta simplicia, cylindrica, flexilia, membranacea, vitrea, articulata, articulis in lamellis planis, apice laciniatis, coadnatis, rectis aut hic et illic inflatis, materia viridi farctis, oscillantibus, sponte dissilientibus.

* I have only seen a separate copy of this memoir which was sent by the author to Miss Ball. It was printed at Brussels in 1838, but whether as part of the Transactions of the Royal Academy of that capital is not stated.

† De ἀφανίζμενον, qui se dissipe.

SPECIES UNICA.

APHANIZOMENON INCURVUM, Nobis, vid. tab. fig. 1—12.

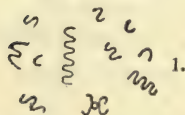
Lamella plana, alba-viridi, incurva, filis coadnatis, articulis 2—8 duplo longioribus, discretis, cæruleo-viridibus.

Habitat in fossis et stagnis aquæ dulcis in Flandria, mense Maio ad Julium.

“ Il est évident que ce genre lie les *conjugées* vrais aux *zygnémées*, par un accouplement bien prononcé chez ces derniers, mais devenant une simple soudure chez les *aphanizomènes*. Il met en rapport les *conjugées* avec les *laminaires* des eaux marines, par la forme de la lamelle qui résulte de la soudure des filets. Il établit une analogie entre les *oscillariées* et les *confervées*, en démontrant qu’un mouvement de reptation, de natation ou d’oscillation, peut appartenir aussi bien à l’organisation des *conferves* qu’à celle des *oscillatoires*, dans lesquels on croit reconnaître les caractères de l’animalité. Les vésicules renflées ramènent l’*aphanizomène* à la *Conferva vesicata* d’Agardh, et les articles, comme l’organisation des filets elle-même, lui conservent avec les *confervées* vrais des rapports si clairs, qu’il serait hors de propos de placer ailleurs que parmi elles ce genre nouveau.”



1. Appearance of *Anabaina spiralis* under a low power of microscope.



2. Its appearance considerably magnified—when consisting of this number of spiral folds $\frac{1}{30}$ of an inch in length.



3. Different appearance of granules as noted in description on Sept. 27.

XI.—Contributions towards a knowledge of the Mollusca Nudibranchia and Mollusca Tunicata of Ireland, with Descriptions of some apparently new Species of Invertebrata. By WM. THOMPSON, Esq., V.P.N. Hist. Society of Belfast.

[With a Plate.]

MOLLUSCA NUDIBRANCHIA, Cuv.

DORIS TUBERCULATA, Cuv. Johnst. Ann. Nat. Hist. vol. i. p. 50. pl. 2. fig. 1. *D. argo*, Penn.

In the late Mr. Templeton’s Journal, “*Doris argo*, Penn., Brit. Zool. p. 22,” is mentioned as twice found by him in

1812, on the shore towards the entrance of Belfast Bay; and Dr. J. L. Drummond informs me, that about the same time he procured a *Doris* here equalling a hen's egg in size, and which he considered to be of this species. At Youghal (county Cork,) it has been taken by Mr. R. Ball, and to this gentleman and myself has occurred at the island of Ireland's Eye, off the Dublin coast. Mr. Geo. J. Allman, of Bandon, has favoured me with specimens procured by him at Court-masherry harbour, county of Cork, where he states that the species is common. The Irish specimens I have seen were generally straw-coloured. In one of them the anterior portion of the foot was margined with a line or band of a fine blue colour.

Doris affinis, mihi.

Body elongated, equally rounded at both ends, depressed, above closely studded with stout prolonged tubercles, orifices of tentacula without sheaths; branchial processes short, numerous, pinnate.

Length $1\frac{1}{4}$ inch, breadth equal to half the length; of a very pale straw colour; tentacula without sheaths, short, lamellate, in all respects resembling those of *D. tuberculata*; cloak covered with long stout tubercles varying in size, the largest along the sides, and $\frac{3}{4}$ of a line in height, generally of equal breadth throughout, but occasionally expanding towards the end, which terminates in a mass or fasciculus of spicula, conspicuous under a low power of the lens, and giving to them the appearance of a spinous armature; margin of the cloak moderately broad, its under surface granulated; space between it and the foot, and also this latter smooth; branchiæ short, pectinate, about 18 in number, disposed in a broadly horse-shoe form as in *D. bilamellata*, and the space within them likewise covered with tubercles.


This *Doris* approaches *D. bilamellata* more nearly than any other British species, and would perhaps be regarded by some authors as only a variety of it; for this reason I have named it *affinis*, to mark that as a species it may be viewed with some suspicion. Compared with *D. bilamellata*, the *D. affinis* has more solidity, is somewhat more depressed, its outline of body less elegant, margin of the cloak narrower, tentacula and branchiæ apparently* less developed, and instead of the

* The specimens were not attended to when living, consequently we must remain in uncertainty about some characters.

pretty rounded termination which the tubercles of *D. bilamellata* generally present, are fasciculi of spicula, and these not so tastefully disposed over the surface of the cloak as in that species: in all respects it is a less attractive animal.

In the month of December 1837, I obtained three specimens of this *Doris* from among oysters dredged at Greencastle, county of Londonderry.

Doris bilamellata, Linn. Johnst. Ann. Nat. Hist. vol. i. p. 53. pl. 2. fig. 8. *D. verrucosa*, Penn.

I have obtained this between tide-marks, at the island of Lambay, off the Dublin coast, and by dredging in about ten fathom water, in Belfast Bay. A specimen which was particularly examined, was found to agree with Dr. Fleming's description of *D. verrucosa* in the number of branchial processes, which are 24, and in their arrangement being somewhat "semicircular," in a broadly horse-shoe form, thus . In Dr. Johnston's specimens, the branchial processes seemed "not much to exceed twelve," and were disposed in an "uninterrupted circle." Annals, vol. i. p. 55. Although the precise number of these organs is of no specific value, the difference alluded to is so great as to be worthy of attention. In a specimen from Newhaven, near Edinburgh, favoured me by Mr. E. Forbes, these processes are twenty in number.

Doris muricata, Mull. Zool. Dan. vol. iii. p. 7. tab. 85. f. 2—4.

I have not unfrequently taken this minute species when (accompanied by Mr. Hyndman,) dredging in the loughs of Strangford and Belfast; it was generally adhering to the leaves of tangle (*Laminaria digitata*). Muller describes it as 5 lines long by 3 broad: my specimens were all even under this size. The *D. muricata* has hitherto been unnoticed in the British seas.

Doris pilosa, Mull. Zool. Dan. vol. iii. tab. 85. figs. 7 and 8. Johnst. in Ann. Nat. Hist. vol. i. p. 54. pl. 2. figs. 9 and 10.

The first Irish specimen of this *Doris* that I have seen was found in Dublin Bay, by G. J. Allman, Esq., to whom I am





British Mollusca.

indebted for it; subsequently two individuals were taken by Dr. J. L. Drummond, when dredging in the month of June in Belfast Bay. Mr. E. Forbes now agrees with Dr. Johnston in considering *D. Flemingii* of his "Malacologia Monensis," (*D. nigricans*, Flem.) a variety of *D. pilosa*. The Dublin Bay specimen is the var.: the others are of the ordinary form.

Doris sublevis, mihi. Pl. II. fig. 1.

D. convex, broadly ovate, smooth, basal sheaths to the tentacula, foot broad, branchial filaments 8, long and finely plumose.

Length of specimen (from spirits) 7 lines, height equal to about half the length, breadth $4\frac{1}{2}$ lines, margin of cloak narrow, foot of nearly equal breadth throughout, tentacula long and acuminate. Colour white.

In being smooth, this species agrees with the *D. levis*, Linn. Mull. Z. D. vol. ii. p. 9. tab. 47. figs. 3—5, but differs much in its convexity* and in the breadth of the foot, which is represented very narrow in that species.

Dredged in Belfast Bay by Mr. Hyndman, September 1835.

Doris Barvicensis, Johnst. Ann. Nat. Hist. vol. i. p. 55. pl. 2. fig. 11—13.

I have been favoured by G. J. Allman, Esq., with specimens of this *Doris*, of which he procured about a dozen in Courtmasherry harbour, in the months of August and September, 1838. They were all found among the roots of *Laminaria digitata* cast ashore, and being alive, a minute description of them, as observed in this state, was drawn up by Mr. Allman. In all details except the following, these individuals agreed with those described by Dr. Johnston in the Annals.—Slightly elevated white tubercles†, chiefly disposed in straight lines, appeared on the sides of the body; 9 branchial leaflets; in the several specimens examined these do not encircle the vent, but are wanting for the space of $\frac{1}{4}$ of a circle posteriorly, two hinder leaflets shortest. On calling Mr. Allman's attention to Dr. Johnston's description, he re-

* "*Doris ovalis alba corpore supra planiuscula lævi*," is Muller's diagnosis of *D. levis*.

† Mr. E. Forbes, to whom the species is well known, considers what are here called tubercles to have been only coloured spots having such an appearance.

marked that the appearance described as an orifice behind the vent, "is merely formed by the partial apposition of the edges of a slit existing in the posterior margin of the mantle, and which approximation is dependent on the will of the animal." In addition to these specimens, beautifully coloured figures, both of the natural size and magnified, drawn by Miss Allman from the living mollusk, illustrate the above points.

Doris elongata, mihi. Pl. II. fig. 7.

*Goniodoris** do. do.

D. elongated, narrow, a row of papillæ on each side the back, branchial filaments about 10, plumose.

Length of specimen (from spirits) 3 lines, breadth 1 line, height $\frac{3}{4}$ line, breadth of body equal throughout.

This species resembles in form the *D. gracilis* and *D. pal-lens* of Rapp. Nova Acta, vol. xiii. part 2. p. 522. tab. 27. figs. 9 and 10.

I obtained this mollusk in June 1838, between tide-marks, at the island of Lambay, off the Dublin coast.

Tritonia Hombergii, Cuv. Johnst. Ann. Nat. Hist. vol. i. p. 114. pl. 3. figs. 1 and 2.

A specimen about 4 inches in length, with the examination of which I have been favoured by Mr. R. Ball, was dredged with oysters some years ago at Howth, county Dublin.

Tritonia lactea, mihi. Pl. II. fig. 3.

T. of a milk-white colour, with 6 large branchial appendages on each side, bifid and ramosely pinnate; mantle terminating anteriorly in 4 arborescent processes.

Length of specimen (from spirits) 8 lines, sheaths of the tentacula deeply fimbriated. Colour milk-white, but with the aid of a lens a few very minute scarlet dots are seen scattered over parts of the body and the branchial appendages.

The approximation of this species to the *T. arborescens*, Cuv. renders necessary some notice of the characters in which they correspond and differ from each other. The dia-

* A new and well-marked genus constituted by Mr. Forbes. See present No. of Annals, p. 104.

gnosis of *T. arborescens* in Fleming's Brit. Anim. p. 284,—“branchiæ 6 on each side, in the form of plumose tubercles,” applies equally to the *T. lactea*, as does the detailed description in the following particulars—“foot narrow, sides compressed; cloak smooth, its margin above the mouth with 4 plumose appendages; branchiæ decreasing in size towards the tail,”—this in *T. lactea* is very small. On comparing it with a specimen of *T. arborescens* from St. Andrews, in Mr. E. Forbes's collection, the most striking difference is in the shorter body of *T. lactea*, and consequently the nearer approximation of the branchial filaments, which are considerably larger than in its congener, whilst the sheaths of the tentacula are somewhat less developed than in that species: the colour too is very different, *T. arborescens* being of a rose-red, varied with darker spots and markings.

The specimen occurred to me when dredging at the entrance of Strangford lough, in the month of October, in company with Mr. Hyndman.

Eolidia papillosa, Johnst. Mag. Nat. Hist. 8. 376. fig. 35. Annals N. H. 1. 118.

Of this fine species, three individuals were found by Dr. Lloyd (of Malahide) and myself, under stones at Lambay island, on the 1st of June; at the same time their spawn, just as described and figured by Dr. Johnston in Mag. N. H. as above-cited, was obtained. One of these animals examined critically had 25 lateral rows of branchial processes, and about 12 of these to each row.

Eolidia Cuvierii, Johnst. Ann. Nat. Hist. 1. 120. pl. 3. fig. 9—11.

Among the *Nudibranchia* which I owe to the kindness of Mr. Allman, was a small individual of this species, taken by him at Courtmasherry harbour, in the autumn of 1838.

Eolidia rufibranchialis, Johnst. Mag. Nat. Hist. 5. 428. fig. 85. Annals N. H. 1. 121.

The first specimen of this *Eolidia* that I am aware of being taken on the Irish coast, occurred to myself at Newcastle, county Down, in August, 1836, but besides its careful pre-
Ann. Nat. Hist. Vol. 5. No. 29. April 1840. H

servation in spirits, no attention was bestowed upon it. In June last, a considerable number of individuals of this species were taken in the dredge near Bangor, (county Down,) by Dr. J. L. Drummond, who being unacquainted with them, at once drew up a very minute and excellent description from the living animals, illustrating it at the same time with several sketches. Under the head of "general observations," it is remarked in Dr. Drummond's journal: "Animal either very active and coursing repeatedly round the basin, or hanging by its disk applied to the surface of the water. Touch very acute, the tentacula and cirri shrinking at the slightest application of a foreign body. On killing a specimen by keeping it some time in fresh-water, the cirri every one dropped off on the slightest touch*." Some of these specimens (from spirits) are of large size, several being $9\frac{1}{2}$ and 10 lines in length. In the disposition and length of the branchial filaments there is great diversity: in one individual these filaments are as long as its entire body, or 7 lines in length; in another of equal size, they are half the length of its body; in some they are conspicuously in fasciculi; in others they appear to be in a continuous row: none however exhibit filaments of a clavate form like those of the *Doris pedata* of Montagu (see Johnston in Annals above-cited); they are generally pointed†.

To the kindness of Edmund Getty, Esq., I owe the results of a day's dredging in Belfast Bay, in October last, among which was a mollusk of this species.

Euplocamus plumosus, mihi. Pl. II. fig. 4.

E. with body elongated, tapering to the tail, 3 plumose branchial filaments.

* Mr. R. Patterson, who accompanied Dr. Drummond on the occasion, favours me with the following note: "To avoid this, I took a number of living specimens, and by the successive addition of some table salt, converted the sea-water into pretty strong brine. While doing so the motions of the animal became gradually more feeble, and then ceased. The branchiæ did not appear detached, and the specimens were placed in a bottle along with the brine in which they had been killed. The result was however the same; they separated as much as if the shock from fresh-water had still been sustained, and the liquid became so foetid and discoloured (perhaps from the presence of too much animal matter,) that the entire contents of the bottle were thrown away."

† Nevertheless I cannot but think that *D. pedata* is identical with the species under consideration.

Length 10 lines, mouth "sub-inferior terminal;" frontal appendages 6, the two central very small, 3 beautifully plumose branchial filaments, situated at about two-thirds the length of the body from the head; mantle separated from the disk by a deep channel; edge of cloak thin and waved; no eyes apparent; lateral appendages 9 on each side, terminated by disks*. *Colour*—body white, tail orange, clavate, tips of the processes surrounding the body orange, as are those of the frontal appendages and tentacula; branchial filaments orange; on the back are a number of papillæ of this colour, as is likewise a line of spots along each side between the cloak and foot.

The gliding motion of this beautiful species along the bottom of the vessel in which it was placed for examination was regular and graceful. It was dredged in Strangford lough, adhering to a *Laminaria*, by Mr. Hyndman and myself, in January, 1835. The description and figure were taken from the living animal.

Of the genus *Euplocamus* I know but five species, three of which, described by Philippi†, have been found in the Mediterranean alone; these differ so much from the northern species as to render comparison unnecessary. The *E. plumosus* in general appearance much resembles the *E. clavigera* of Muller, but differs from it in having only 3 instead of 4 branchial filaments, and in these being *plumose*—in this character too, it differs from the *E. pulcher*‡ of Dr. Johnston, although the number of these filaments is the same in both; besides, its body and lateral appendages are more elongated; altogether it is a much more graceful animal than the last mentioned.

* Mr. Forbes suggests that these may possibly be suctorial.

† *E. croceus*, Phil. Enum. Moll. Siciliæ, p. 103. tab. 7. fig. 1. *E. frondosus* and *E. cirriger*. Ann. Nat. Hist. vol. iv. pp. 88 and 89. pl. iii. fig. 1 and 2.—translated from Wiegmann's Archiv.

‡ Dr. Johnston first described this species under the name of *Tergipes pulcher*, and subsequently constituted a new genus, *Triopa*, for its reception. Ann. Nat. Hist. i. 124. He was unaware at the time that the same judicious view had previously been taken by Philippi, who founded his genus *Euplocamus* on an allied species. This latter name, in right of priority, must be retained. Mr. Forbes has taken the *E. pulcher* at the Isle of Man and at Shetland; and joining him, as I do, in the opinion that it is distinct from *E. clavigera*, I have ventured to restore the original specific name. The genus *Triopa* will still rank under its banner the anomalous *T. nothus* of Dr. Johnston.

"*Polycera quadrilineata*," var. *nonlineata*. Pl. II. fig. 6*.

Doris quadrilineata, Mull. Zool. Dan. vol. 1. p. 18. tab. 17. fig. 4—6.

Frontal processes of the mantle 4, angles of the foot produced; pair of branchial lobes rather small.

Length of specimen (from spirits) 3 lines; body broadly truncate anteriorly, tapering to the tail; tentacula lamellated; 3 branchial filaments; eyes two, at the inner side of the posterior base of the tentacula. *Colour*—whitish, with the frontal processes of an orange-yellow; a few scattered dots of this colour on the mantle.

Although the four black lines described by Muller as extending in an interrupted manner along the body of *P. quadrilineata*, are entirely wanting in my specimens, I cannot, possessing as they do every other character in common with it, regard them as of a different species. They are at the same time quite distinct from the supposed varieties of *P. quadrilineata* figured in table 138 of the 'Zoologia Danica.'

Three individuals of this species occurred to us on the same occasion as the *Tritonia lactea*, when dredging at the entrance of Strangford lough; they were adhering to *Laminaria digitata*. When placed in a phial of sea-water, they were generally to be seen suspended by their threads from the surface, the body at the same time moving freely about with much grace. This species has hitherto been unnoticed in the British seas.

Polycera typica, mihi. Plate II. fig. 5.

P. with 4 frontal appendages, tapering towards the point; tentacula lamellate; branchial lobes very large.

Length 5 lines, body narrow, tail tapering; branchial filaments elongated, in a tuft anterior to the lobes; disk thin and flexible at the edges. *Colour*—whitish, tentacula and branchial lobes tipped with yellow; back and sides thinly studded with tubercles (spots?) of a yellow colour, three of which are in the middle of the back, and six or seven close to the tuft of branchial filaments; the intestines (seen through the skin) of a dark colour.

Of this well-marked species, two individuals were dredged in Strangford lough, by Mr. Hyndman and myself, in

* The figure is necessarily stiff, having been drawn from a dead specimen. Muller's was done from the living animal.

January, 1835, at the same time with *Euplocamus plumosus*. They seemed partial to coming to the surface of the water in which they were for some time kept, and to moving along with the foot upwards.

From the *P. quadrilineata* and *P. cornuta* (vol. 4. p. 29. tab. 145. fig. 1—3.) of the 'Zoologia Danica', the *P. flava* of Montagu (Linn. Trans. vol. vii. p. 84. pl. 7.) and the *P. lineatus* of Risso, (Hist. Nat. l'Eur. Merid. iv. pl. 1. fig. 5.) all the species of *Polycera* that I have seen described and figured, the *P. typica* differs remarkably in the development of the branchial lobes. The *P. capensis*, Freycinet, is known to me by name only.

All the *Mollusca Nudibranchia* treated of in this communication are for the first time recorded as Irish species.

MOLLUSCA TUNICATA.

The *Mollusca Tunicata* have in Ireland as in other countries engaged very little attention; yet if mere outward beauty be any attraction to the naturalist, where will he behold it more surpassing than in the compound species of this portion of the animal kingdom? Of every hue—arrayed in purple and gold—will he find them even in this "cold and cloudy clime."

The species of the British seas are now, I rejoice to state, about to be investigated by naturalists highly qualified for the task. This I learned when about to attempt entering on the study of our native species; and communicating my specimens to the parties alluded to, that in connexion with their own they might be properly elucidated, I at once ceased from my incipient investigation. For this reason, the following species, belonging to the first division, "*Ascidies Simples*," are placed, without regard to systematic arrangement, merely under the name used by the author in whose work I found them described. Small as is the number, the species are one-half more numerous than those published in 1828 in Fleming's British Animals.

**Ascidia venosa*, Mull. Zool. Dan. vol. i. p. 25. tab. 25.

* This mark before the species denotes those which I have not seen recorded as British—the others are new only to the Irish Fauna.

Obtained by dredging in the loughs of Strangford and Belfast; first distinguished as an Irish species by Dr. J. L. Drummond. It is remarked by Muller to be common about Christiansand.

Ascidia prunum, Mull. Z. D. vol. i. p. 42. tab. 34. fig. 1—3.

Procured in the same localities as last.

**Ascidia aspersa*, Mull. Z. D. vol. ii. p. 32. tab. 65. fig. 2.

As last.

**Ascidia scabra*, Mull. Z. D. vol. ii. p. 33. tab. 65. fig. 3.

As last. Possibly not distinct from it.

Ascidia rustica, Linn. Mull. Z. D. vol. i. p. 14. tab. 15.

Commonly investing the larger marine plants—found on shells, stones, &c. This species is much less common on our shores in the adult than in the young state, when assuming a flattish oval form, and coloured like red cornelian, it is seen beautifully studding our larger Fuci.

Lamarck strangely considered that the *A. scabra*, Mull. might be identical with this—they certainly have no relation to each other. Nor can I believe with him that the *A. patula* and *A. aspersa*, Mull. have any connexion with *A. rustica*. Anim. sans Vert. t. 3. p. 123.

**Ascidia parallelogramma*, Mull. Z. D. vol. ii. p. 11. tab. 49.

I have taken this beautiful species (which is admirably represented in the work just cited,) on different occasions when dredging in Strangford lough; it was attached to Algæ.

Ascidia echinata, Linn. Mull. Z. D. vol. iv. p. 10. tab. 130. fig. 1.

Of this well-marked and pretty species, I obtained an individual parasitic on one of the larger *Ascidie* dredged in Strangford lough.

**Ascidia orbicularis*, Mull. Z. D. vol. ii. p. 53. tab. 79. f. 1, 2.

Obtained on *Zostera marina* in Strangford lough.

**Ascidia mammillaris*, Delle Chiaie, vol. iii. p. 187, 197. tav. 45. fig. 14.

Found attached to *Laminaria digitata*, &c. in Belfast and Strangford loughs. The spinous tubercles in my specimens

are not so regularly disposed over the body as represented in Chiaie's work; they are most developed about the orifices.

**Cynthia claudicans*, Sav. Mem. p. 150. pl. 2. fig. 1.

Not uncommon on oysters and other shell-fish taken in the north-east of Ireland. Savigny describes it as common on the oysters brought to Paris.

Phallusia intestinalis, Sav. Mem. p. 169. pl. 11. fig. 1.

Obtained in Strangford lough.

Clavelina lepadiformis, Sav. p. 110, 174.

Ascidia lepadiformis, Mull. Z. D. vol. ii. p. 119. tab. 79. f. 5.

As last.

**Distoma rubrum*, Sav. Mem. p. 177. pl. 3. fig. 1. and pl. 13.

On *Laminaria digitata*, dredged in Belfast Bay, by Edm. Getty, Esq., and kindly sent me. This species was communicated by Leach to Savigny, who notices it simply as inhabiting the European seas. My specimens were not of so lively a colour as represented in Savigny's work.

Distoma variolosum, Gaërt. Sav. Mem. p. 38 and 178.?

A *Distoma* apparently from description (I have not seen any figure) of this species has occurred to me investing *Fucus serratus* in Belfast Bay; the colour was always whitish-yellow. Gaërtner announced the *D. variolosum* to be found enveloping *Fucus palmatus*, on the coast of England.

Botryllus Leachii, Sav. Mem. p. 199. pl. 4. f. 6. and pl. 20. f. 4. Delle Chiaie, vol. iii. p. 94. tav. 36. f. 14—16.

North-east of Ireland, occasionally investing the roots of *Laminaria digitata*, &c.; when dried it has somewhat the appearance of a sponge. This species was sent by Leach to Savigny, who marks it with doubt as from the English coast. On the shores of Naples it has been found by Delle Chiaie as above cited.

Botryllus Schlosseri. Phil. Trans. vol. 49. p. 449. pl. 14.

I have occasionally obtained this on Algæ, in the loughs of Strangford and Belfast, and have found it attached to stones at the island of Lambay, Dublin coast.

**Botryllus polycyclus*, Sav. Mem. p. 47. pl. 4. fig. 5. *Botryllus Renieri*. Delle Chiaie, vol. iii. p. 93.

This very beautiful species, which is admirably described by Savigny, I have found much more common in the north of Ireland than the *B. Schlosseri*; it occurs chiefly on the leaves of *Laminaria digitata*. The Adriatic Sea and the Manche are the localities whence Savigny procured it. What Delle Chiaie figures as a variety of this species, tab. 36, fig. 9, has occurred to me as commonly as the ordinary state.

Sydneum turbinatum, Sav. Mem. p. 239.

I once procured this in Strangford lough; and by Dr. J. L. Drummond it has since been found in Belfast Bay.

In the Magazine of Nat. Hist., vol. vii. p. 129, *et seq.*, two *Ascidiae* are figured and described as new by "C. M.,"—a signature adopted by my friend Robert Templeton, Esq., Roy. Art., in this and another communication in the same vol. p. 10. To the first, *Asc. gemina*, no habitat is given, but the entrance to Strangford lough may be mentioned as one, as I have found the species there, adhering to the submerged rocks. The *Asc. anceps* is perhaps not distinct from *Asc. prunum*.

INVERTEBRATA MISCELLANEA.

MOLLUSCA.

Ianthina nitens, Menke.? Philippi Enum. Moll. Siciliæ, p. 164. tab. 9. fig. 16.? *I. pallida*, Harvey MS. Pl. II. fig. 2.

This *Ianthina*, of which a number of specimens were found some years ago by my friend W. H. Harvey, Esq. (the well-known botanist) at Miltown Malbay on the coast of Clare, is very distinct from the two known British species, *I. fragilis* and *I. exigua*, and was named *I. pallida* by Mr. Harvey; whether it be really a nondescript species is difficult to be determined. The nearest approach I find to it is the *I. nitens*, Menke, as described and figured by Philippi in his excellent 'Enumeratio Molluscorum Siciliæ,' but from this it differs in the columella being curved so as to present a somewhat rounded appearance, instead of being straight; the *Ianthinae*, however, are subject to considerable variety. With the exception of this character, it agrees well in *form* with the *I. prolongata*, Blain., figured in Payraudeau's 'Moll. de Corse;' but the colour of this, (dark blue,) is very different

from mine. Philippi at the same time quotes the *I. prolou-gata* in Payraudeau as identical with his, which in colour, "pallide violacea," is similar to the Irish specimens, hence named *pallida*. This author again refers to what Blainville figures as one of the forms of *I. fragilis* (Malac. tab. 37 bis. fig. 1.) for a representation of his *I. nitens*. Philippi's diagnosis of this species is, "Testa ovata, obtusa, anfractibus omnibus valde rotundatis, sutura profunda divisis, apertura semiovata, labro profunde exciso angulo columellæ cum labro acuto." Habitat, Sicily. Size of Irish specimens, 11 lines long, $8\frac{1}{2}$ broad.

The genus *Ianthina* is in much confusion, which the present notes tend in no way to clear up: they are only intended to introduce a third species of this attractive genus to the British Fauna.

Rissoa Harveyi, mihi. *Cingula sculpta*, Harvey's MS. Pl. II. fig. 11.

This species—two lines in length—is most nearly allied to the *R. excavata*, Philippi, (Enum. Moll. Sicil., p. 154. tab. 10. fig. 6), the following description of which, with the mere substitution of the numbers between the brackets, is equally applicable to *R. Harveyi*.

"*Rissoa excavata*, mihi, tab. x. fig. 6.

"*R. testa oblonga, obtusa, alba, anfractibus superne angulatis, medio concavis, longitudinaliter costatis, ultimo inferne cingulis tribus transversis elevatis instructo, apertura ovata simplici [costæ circiter 12 (24) in quovis anfractu* superne et inferne angulatæ.]*

"*Testa minuta, 1''' longa (2), oblonga, anfractibus 4—5 (6), apice obtuso; apertura ovalis superne vix angulata, labrum simplex.*" Mouth not so large as in *R. excavata*.

This shell was discovered at Miltown Malbay (county of Clare), by Mr. W. H. Harvey, some years ago, and characteristically named by him *C. sculpta*; the term *insculpta* being applied to a species of the allied genus *Odostomia*, has induced me, perhaps unnecessarily, to change the name. The species is dedicated to its discoverer, who had success-

* My species shows the necessity of making this part of the diagnosis: the words used are Philippi's, and taken from his general description.

fully studied our native Mollusca before his attention was directed to botany, in which department his labours have now long been known and appreciated.

Rissoa tristriata, mihi. Pl. II. fig. 10.

R. conic, volutions $5\frac{1}{2}$, rounded, smooth, with spiral rows of tawny spots, first whorl very large, aperture roundish oval, umbilicus none, 3 striæ winding round the summit of each whorl.

Length $1\frac{1}{2}$ line.

A connecting link between *R. semistriata* and *R. interrupta*. Found at Youghal by Miss M. Ball.

Rissoa Balliæ, mihi. Pl. II. fig. 9.

R. elongated, white, apex obtuse, 5 slightly rounded whorls, deeply marked longitudinally with somewhat distant striæ, aperture ovate, margin of the mouth thin, lower portion of the first whorl spirally striated. Length $1\frac{1}{2}$ line.

Although of a more slender form, this species, in sculpture, &c., somewhat resembles *Odostomia spiralis*, but is a true *Rissoa*.

Found at Youghal by Miss M. Ball, after whom it is named, though a very trivial compliment to her acquirements in different departments of the Invertebrata of Ireland.

Turritella fulvocincta, mihi.

T. with about 11 whorls, transversely ribbed, spirally striated, whitish, with a single fulvous band winding round the volutions.

Length $3\frac{3}{4}$ lines.

Found at Portmarnock, near Dublin; and communicated to me by Miss M. Ball.

“*Cerithium reticulatum*, var. β .” Harvey’s MS. Pl. II. fig. 8.

Whorls 9 or 10, with three spiral ridges, the uppermost very prominent and forming a keel round the suture, ridges crossed by somewhat distant longitudinal furrows.

Length $3\frac{1}{2}$ lines, breadth $1\frac{1}{2}$; colour purplish brown.

This shell differs from *C. reticulatum* in the prominent keel bounding the whorls on the upper side, and in the spiral furrows being much deeper than the longitudinal, and these rather less marked than in that species.

As one individual only has been obtained, I named it, doubtfully as new, *C. carinatum*; but according to the better judgment of Mr. Harvey, it is only a variety of *C. reticulatum*; the shell was found by this gentleman at Miltown Malbay.

Natica.

A shell belonging to this genus, obtained at Youghal by Miss M. Ball, presents the following characters. It is in length 12, in breadth 9 lines, of a tawny colour, without bands or markings of any kind; in form it is similar to *N. Alderi*, but is a larger species; umbilicus divided by a spiral ridge.

To my friend Mr. E. Forbes, who has attentively studied the British *Naticæ*, I submitted this shell, but he had not seen any like it. Until more specimens are examined, (more, I understand, have been procured,) I am unwilling to designate it as a new species; but should it prove to be so, I would propose *N. fulva* as an appropriate name.

The *N. castanea*, Lam., is stated by M. Reclus, who has examined the original specimens, to be identical with *N. monilifera*. Lam. t. viii. p. 625, 2nd edit. M. Deshayes sets it down as the young of this species. Id. p. 639*.

ECHINODERMATA.

Ophiocoma Ballii, mihi.

Disk round or pentangular, covered with imbricated scales, two diverging broadly wedge-shaped scales at the base of each ray.

Largest specimen—disk $2\frac{1}{2}$ lines broad, rays in length nearly equal to four times its breadth; *rays* above with fan-shaped scales, beneath with rudely heart-shaped plates; *spines* four in each row, rough, as long or longer than the breadth of ray. Colour pink.

* In a MS. sent me by my friend Robert Templeton, Esq., Roy. Art., before his departure for Ceylon, are the following descriptions of what he considered to be two new species:

“*Nautilus pulchella*, mihi. Size $\frac{1}{15}$ inch, opaque white, exteriorly crenated, becoming toothed towards the inner volutions; chambers about 20, marked externally by a depression, adjoining which the shell is minutely tuberculated, or crenato-tuberculated.

“Among some minute shells from Bangor, county Down, presented me by Mr. G. C. Hyndman.

Nautilus dentatus, mihi. Size $\frac{1}{2}$ inch, opaque white, chambers of the last whorl about 12, broad, crenato-tuberculate exteriorly, the margin toothed, the teeth less acute towards the mouth. With last.”

Several specimens of different size dredged some years ago in Dalkey Sound, on the coast of Dublin, by R. Ball, Esq. The species is named after my friend, than whom no one in Ireland does more to advance the science of natural history.

Holothuria Drummondii, mihi.

H. of an olivaceous and white colour, with light brown suckers, which are very numerous on the angles, from 6 to 12 in each transverse irregular row; when contracted, tentacula long, pedicled, trifid, plumose, purple.

Length 10 inches.

After having been kept in spirits for a short time, it appears angular, corrugated, the corrugations smooth; a few suckers between them.

The specimen was dredged in Belfast Bay, in the month of June, by Dr. J. L. Drummond, who drew up the following description from the living animal:

“Bangor, June 27, 1839. *Holothuria* dredged yesterday of an olivaceous and white colour; at first, the shape of a lemon, and nearly as large as a middle-sized one; today, ten inches long, contracting itself slowly in various places, but has not yet shown its tentacula. It has five broad longitudinal bands of tubercle-like suckers running from end to end; these have four in each transverse row; suckers light brown; down the middle of each of the five series a whitish band extends; spaces between the belts of suckers of a blueish-white, with numerous irregular narrow transverse whiter lines of various breadth.”

Holothuria Hyndmani, mihi.

H. white, 5-angled, skin smooth, a double close row of large (non-retractile?) suckers on each angle; tentacula 10, sessile, white, plumose.

Length 2 inches.

Dredged in Belfast Bay, by my friend Mr. G. C. Hyndman, a well-informed and zealous naturalist, to whom it is dedicated*.

* “*Holothuria brunnea*, Forbes MS.

“*H.* brown, angulated, suckers 6 to 8 in each row, tentacula long, whitish, pinnated towards their extremities. Forbes.”

This minute *Holothuria*, generally under an inch in length, is the most common species taken by dredging in the loughs of Strangford and Belfast.

Sipunculus papillosus, mihi.

S. vermiform, brownish white, skin striated concentrically and covered with brown papillæ.

This is a fine and large species; throughout the greater part of its length posteriorly, the papillæ are more numerous and larger on the two sides than on the dorsal and ventral surfaces, and are particularly numerous at the posterior extremity, which is pointed and not perforated. It does not appear to be parasitic.

Specimens have been obtained at Miltown Malbay by Mr. Harvey, and at the south islands of Arran (an adjacent locality) by Mr. Ball. Mr. Harvey informs me that this species is not uncommon under stones in sand-covered rocks at Miltown Malbay.

The last four species will be more fully treated of, and figured, by Mr. Forbes, in his forthcoming work on the British Echinodermata.

ZOOPHYTA.

Flustra stellata, *Membranipora stellata*, mihi*.

M. stellate, or of a sub-stellate outline, cells without hairs or setæ.

Polypidom of a light sandy colour, encrusting the larger marine Algæ in somewhat of a stellate form; a few inches in diameter; aperture of the cells without hairs or bristles (like those of *M. pilosa* and *M. spongiosa*, Temp.†), but beset with spines or denticles, varying much in number, one at the base generally exceeding the others in magnitude. Along the centre of each ray extends a series consisting of a few rows of oblong or roundish-oblong cells, on either side of which are transverse rows of square and roundish cells considerably larger than those which constitute the central portion; "parietes of the cells prettily punctured‡." This description applies to the species in its most perfect state. When the

* Considering all the generic characters of *Flustra* and *Membranipora*, the present species would seem to appertain about as much to the "crustaceous" division of the former as to the latter genus.

† Brit. Zooph. p. 282. This is identical with *Flustra? carnosa*, Johnston.

‡ A character that I had overlooked, but which was noticed by Dr. Johnston.

stellate figures coalesce—which they rarely do—so as to cover the surface of the plant, the form and arrangement of the cells, as just mentioned, are generally preserved. When deviations from this arrangement do occur, the general form of the zoophyte is the most obvious character. This species first occurred to me in Belfast Bay, in September, 1833, when a quantity of tangle, *Laminaria digitata*, had been thrown ashore, on the broad leaves of which its stellate form at once arrested my attention. In Strangford lough I similarly found it afterwards; and more recently in Scotland, near Ballantrae (Ayrshire), on *Fucus serratus*, but not in perfection on this plant, whose leaves are too narrow to permit its perfect growth: on the shore at Leith too I have gathered it; and on a specimen of *Nitophyllum Gmelini*, from Sidmouth, favoured me by Dr. Greville, it appears. Its distribution would thus seem to be extensive.

I lately ascertained that it had been found by Dr. Drummond, many, perhaps thirty, years ago, at Larne. In the Supplement to Dr. Johnston's British Zoophytes the species will be figured.

To my accomplished friend Edward Forbes, Esq., I am indebted for the figures which illustrate this paper; without the aid too of his superior knowledge, a portion only of the species here introduced as new could, with any degree of certainty, have been announced as such.

REFERENCES TO PLATE II.

Fig. 1. *Doris sublævis*.

2. *Ianthina nitens*?

3. *Tritonia lactea*.

4. *Euplocamus plumosus*.

5. *Polycera typica*.

6. *Polycera quadrilineata*, var.

Fig. 7. *Goniodoris elongata*.

8. *Cerithium reticulatum*, var.

9. *Rissoa Balliæ*.

10. *Rissoa tristriata*.

11. *Rissoa Harveyi*.

XII.—On some New and Rare British Mollusca. By EDWARD FORBES, M.W.S., For. Sec. B.S., &c.

[With a Plate.]

I. *DORIS ARGO*. Dr. Johnston pointed out some time ago that the *Doris Argo* of Pennant and British authors generally

was not that species, but the *Doris tuberculata* of Cuvier, and accordingly described it as such in the Zoological Journal and in his valuable paper on Scottish Mollusca in the first volume of the Annals. During the last two years, however, I have dredged on the Manx coast two specimens of a *Doris* which may be considered as the true *Argo*, and as such is an addition to the British Fauna. This *Doris* is of an oval form, the largest $1\frac{1}{2}$ inch in length, by rather more than $\frac{5}{4}$ broad. It is of a most vivid orange-red colour with lighter specks on the back. The mantle is covered with very minute papillæ, and round the base of each tentacle, which is formed as in other *Dorides*, there is a circle of papillæ somewhat larger than those studding the back. The branchiæ are ten in number, bipinnate, bright red edged with blackish green. The foot is smooth and red. It was dredged in about 20 fathoms water on the shell-bank off the coast of Ballaugh, Isle of Man. In its motions it is extremely sluggish, but from the beauty of its colouring is a most attractive species.

The original *Doris Argo* is represented in Bohadsch, "*De quibusdam Animalibus Marinis*," tab. v. figs. 4 and 5. The animal there figured was 3 inches and 5 lines long; but the accompanying description well agrees with my specimens. In the figure it seems smooth, and as such it has generally been described, but from their minuteness the papillæ might have easily been overlooked. Bohadsch's description of the colour of its back, "*In parte prona seu dorso colore coccineo splendet*" (p. 66), is most appropriate. The origin of the name "*Argo*" as applied to this species is singular. Bohadsch, observing the summits of the tentacula to be speckled with minute black specks, fancied them to be eyes, and accordingly bestowed on his animal the name of *Argo* or *Argus*, as he said he could easily count a hundred or more of these eyes. This speckled appearance is seen on the tentacula of many *Nudibranchia*, and is merely a variation in the colouring of the animal.

II. *DORIS MAURA*. *Nov. Sp. Forbes*. Plate II. fig. 17.
D. elongata, *dorso nigro cœruleo-maculato, tuberculis carnis*

obtecto, tentaculis carneis basi tuberculatis, branchiis albis, pede albo. Lon. $1\frac{1}{4}$ unc.

This beautiful addition to our Fauna was found in July last under a stone at low water at Devar Island, near Campbelltown, Argyleshire. In form it is more elongated than any other British species of its division. Its colouring is most remarkable: the ground colour of the mantle is jet black, dotted here and there with little round spots of the brightest cobalt blue, and covered at regular distances by ovate pink tubercles, which are larger around the roots of the large white plume-like branchia (six in number), and also around the bases of the tentacula. The tentacula are singular, on account of being planted as it were on the summit of a tubercled pedicle, in shape resembling the stalk of a clove. This pedicle is pink, the tentacula darker, rather inclined to brownish; some of the tubercles, especially those near the anus, are lobed. The foot is pinkish white, its anterior margins not produced into tentacula. The creature is rather sluggish in its motions, but noble in its aspect: its ornate mantle, its sceptre-like tentacula, and plume of snowy branchiæ like ostrich feathers, dignifying it much above its British brethren.

III. NOV. GEN. GONIODORIS. *Forbes.*

Body prismatic: mantle marginally reflected, abbreviated posteriorly: oral veil forming two sustentacula: posterior extremity acute, caudiform: branchiæ dorsal, unprotected.

Having to describe a new prismatic *Doris*, I avail myself of this opportunity to characterize the above genus; the establishment of which I consider absolutely necessary for the following reasons. The dorso-branchiated *Nudibranchia* form a most natural family, consisting of the genera *Doris*, GONIODORIS, *Polycera*, (*Thecacera*?), and *Euplocamus*, which last genus conducts us to the next family, the *Tritoniaceæ*. On reviewing their characters, we find their generic distinctions to depend, 1st, on the form of the body; 2nd, on the form of the mantle; 3rd, on the sustentacula; 4th, on the posterior termination; and 5th, on the position and protection of the breathing organs, which also afford

family characters along with upper-tentacula, the structure of which is laminated throughout the tribe.

GONIODORIS EMARGINATA. Nov. Sp. Forbes.

G. ovata, pallio postice emarginato dorso lævi, sustentaculis ovatis, acutis. Lon. $2\frac{1}{2}$ lin. (Plate II. fig. 12.)

The body of this species is quadrangulately ovate, the mantle broad, turned up and waved at the margin: posteriorly it is deeply notched. The back is smooth. The branchiæ are six in number; the upper tentacula are rather long, the lower ovate, acute, and largely developed. The back is of a fawn colour, the branchiæ and foot white, the border of the mantle yellow, and there is a yellow stripe on the tail. It was dredged in twenty fathoms water off the coast of Ballaugh, Isle of Man, in October, 1839.

On the same coast also occurs at low water, in considerable abundance, the *Doris nodosa* of Montagu, another species of this genus. As it seems to have escaped British naturalists for many years, I add a description from my Manx specimens. In form it is quadrangulately oblong: the mantle is broad, turned up and waved at the margin, the back smooth, with a central carina and four equidistant papillæ on each side. The lower or oral tentacula are lanceolate, acute and large; the upper or dorsal laminated. The branchiæ are from 7 to 9 in number, plumose, narrow, arranged in a circle (sometimes interrupted), forming an erect cup. The scallops or wavings of the cloak are generally eight on each side, and the papillæ appear to be mucronate. The colour of the back is white tinged with rose: the foot, tentacula, and branchiæ are white, and there is a yellow stripe on the tail. This stripe is seen in several species of this genus. The *Goniodoris nodosa* is nearly three-fourths of an inch in length.

The *Doris Barvicensis* of Dr. Johnston (Annals Nat. Hist. v. i. p. 55., Pl. II. fig. 11–13) is a *Goniodoris*. In addition to the locality originally given, it was found by Mr. Goodsir and myself during the past summer under stones at low water in Bressay Sound, Shetland. The *Doris pallens* and *Doris gracilis* of Rapp (Nov. Acta Acad. Nat. Curios., tom. xiii. 2nd part), also belong to this genus. The sources of

Ann. Nat. Hist. Vol. 5. No. 29. April 1840. I

specific characters in this genus appear to be: 1st, the general form as regards elongation; 2nd, the smoothness or roughness of the back, including the number of papillæ, when present; and 3rd, the form of the oral or sustentacula. The genus ranges from the northern shores of Britain to the south of Italy.

IV. *MONTAGUA VIRIDIS*. Nov. Sp. Forbes. Plate II. fig. 18.

M. elongata alba, branchiis elongatis viridibus apicibus albis, in seriebus quinque digestis: tentaculis superioribus longioribus. Lon. $0\frac{1}{8}$ unc.

The body of this very distinct new species is lanceolate, tapering gradually to the finely attenuate tail. On the back there are five transverse rows of long branchiæ, seven or eight in the broadest rows, which are those placed foremost. There appear to be no papillæ on the sides as in the two other British *Montaguæ*. The head is furnished with four long tentacula, the uppermost ones longest, and have two large black eyes at their bases. These tentacula do not appear to be ciliated: they are rugose, or wrinkled concentrically. In this respect they differ from the tentacula of such *Eolidæ* as have their branchiæ arranged in lateral tufts, which have the upper tentacula ringed and covered with vibratile cilia. Such cilia are seen also on the laminated tentacula of *Doris*: those on the upper tentacula of *Goniodoris nodosa* are larger than the branchial cilia in that species: the lower or oral tentacula are not so covered. The upper and lower tentacula among most of the Nudibranchia, perhaps in all, are evidently very different organs, the latter for touch, the former for some finer sense.

The body and tentacula of *Montagua viridis* are white, saving a narrow greenish line down the back. The branchiæ are green with white ocellated tips and sometimes a few scattered dark green spots. The green colour is caused by a circulating fluid, the particles of which may be seen rushing from the central vessel or dorsal stripe into the branchiæ, where they remain for a short time, and then flow back.

This pretty little species was found on a specimen of *An-*

tennullaria indivisa, dredged in deep water off the coast of Ballaugh, Isle of Man, September 30, 1839.

V. *RISSEA RUPESTRIS*. *Nov. Sp. Forbes*. Plate II. fig. 13.

R. testâ oblongo-turritâ, albâ, anfractibus 7 planulatis, ultimo basi striato; suturis marginatis; labro simplici. Lon. $0\frac{2}{10}$ unc.

Shell translucent, white, with seven flat whorls, which are almost smooth; round the summit of each runs a spiral stria, which gives a marginated appearance to the suture. The basal whorl is slightly carinated and spirally striated below the carination; a few obsolete striæ sometimes appear above: the mouth is pear-shaped, and has no rib thickening the outer lip; the pillar lip is broad, and slightly folded back. Animal milk-white.

This *Rissoa* is found in crevices of rocks at half-tide along with *Rissoa cingilla* (to which it is nearly allied), *Kellia rubra*, and *Auricula alba*, at Kirk Santon Head, Isle of Man.

VI. *PLEUROTOMA SMITHII*. *Nov. Sp. Forbes*. Plate II. fig. 14.

P. testâ fusiformi-turritâ, sub lente tenuissime striatâ; anfractibus 8 convexiusculis, costatis, costis 12: aperturâ oblongo-lanceolatâ, spirâ multò brevior, caudâ brevi. Lon. $0\frac{4}{10}$ unc.

This pretty species has the whorls slightly rounded, and ornamented with strong longitudinal ribs, which are not, however, continuous from whorl to whorl. The whorls are slightly angulated at their summits: the sutures are deep. Its colour is yellowish white, with numerous spiral bands of yellowish brown, which give it a very elegant appearance. The mouth is oblong, and the outer lip is thickened by a rib. The canal is short and slightly inclined to the left. I have dedicated it to James Smith, Esq., of Jordanhill, by whom it was dredged in July last in Lamlash Bay, Arran.

VII. *PLEUROTOMA COARCTATA*. *Nov. Sp. Forbes*. Plate II. fig. 15.

P. testâ anguste fusiformi, striatâ, anfractibus 7 convexiuscu-

lis, costatis, costis 7; aperturá angustè lanceolatá; caudá mediocri. Lon. $0\frac{4}{10}$ unc.

The shell of this species is more attenuate than the last, and the mouth and beak longer and much narrower; seven strong ribs proceed from base to apex in the manner of those on *Pleurotoma septangularis*, to which it is nearly allied, but differs, besides form, in being spirally striated: it is nearly as strong. Its colour is dusky white, with obscure rufous spiral bands. Several specimens were dredged at the same time and place with the last.

VIII. PATELLA? ANCYLOIDES. *Nov. Sp. Forbes.* Plate II. fig. 16.

P. testá, tenuissimá, pellucidá, rotundatá, gibbá, albá, sub lente reticulatá, vertice versus marginem inflexo. Lon. 2 lin.

Possibly a *Lottia*. A shell so nearly resembling an *Ancylus*, that had I not dredged it, I should have looked on it as such. The apex is more incurved than in any of our other species of smaller *Patellæ*, and the shell much more conical. It was dredged along with the two last described species in Lamash Bay, Arran.

XIII.—*Catalogue of the Species of Reptiles collected in Cuba by W. S. MacLeay, Esq.;—with some Notes of their Habits extracted from his MS.* By J. E. GRAY, Esq., F.R.S.

THE Catalogue is a continuation of the former one of Mammalia from the same island, published in a former Number of this work, vol. iv. p. 1.

It is worthy of remark that all the species described in the former paper are different from any mentioned in the Fauna of Cuba now in course of publication by M. Sagra. Several of the reptiles contained in this list appear to have been also found by that naturalist; but others which have been brought home by Mr. MacLeay we have reason to think have escaped his research.

As the species of the genus *Anolis* are difficult to distinguish, and as there are several species in the British Museum which I cannot refer with any certainty to the species described by

Messrs. Dumeril and Bibron, I have added to the paper a description of them.

REPTILIA.

CYCLURA.

1. *Cyclura carinata*, Harlan, Jour. Acad. Sci. Philad. iv. 242. t. 15. Iguana *Cyclura*, Cuv. R. A. ii. 45. Iguana (*Cyclura*) *carinata*, Gray, Griffith A. K. ix. 39.

Cyclura Harlani, Coct. Hist. Cub. Erp., t. 6. Dum. and Bibr. iv. 218.

Young *Lacerta nubila*, E. W. Gray, MS. Brit. Mus. *Cyclura nubila*, Gray, Griffith A. K. ix.

This is probably the *Guana* figured by Catesby in his Carolina, ii. 68. t. 64.

"Found in the Isle of Pines, where it occurs of a large size nearly 4 feet long, and in great numbers. It runs with extreme velocity: becomes easily domesticated. In confinement it would not eat any kind of meat, but was very fond of bread and biscuit."—W. S. M.

LEIOCEPHALUS.

2. *Leiocephalus carinatus*, Gray, Phil. Mag. ii. 208. Synopsis of Griffith's A. K. ix. 42.

Holotropis microlophus, "Th. Cocteau in Sagra Hist. Cub. Rept. t. 5. ined." Dum. and Bibr. Hist. Rept. iv. 264.

Roquet of Rochefort Hist. Nat. and Mor. des Antilles, 131.

Bibron by mistake refers my *Leiocephalus carinatus* to his *Holotrophis Herminieri*, which has according to his description and figures the ventral scales strongly keeled. He considers that this specimen is the same as *Tropidurus Schreibersii* of Fitzinger's Catalogue.

The Cuban specimen agrees exactly with the specimens on which the species was established, except in being rather larger and in having one large in the place of 3 or 4 small plates in the centre of the muzzle behind the nose.

A second younger specimen has the smaller frontal plates rather different from either of the other specimens, and the tail is regularly brown-banded. It has no anterior odd plates between the two anterior pair.

This animal is the *Roquet* described by Rochefort, and referred to by Mr. MacLeay in his paper on *Urania* and *Mygale* in the Transactions of the Zoological Society 1831, where he observes, "It does not change its colour; nor, as far as I know, does it distend the throat like the genus *Anolis*, neither are the toes as in that genus supplied with oval discs for climbing, so that it is never seen on trees. Never-

theless Cuvier gives the name of *Roquet* to a species of his genus *Anolis*, which by the way is not the *Anolis* of Rochefort but his *Gobemouche*, so that the confusion is almost inextricable;" and he further observes, "the under side of the belly and legs is of a dirty cream-colour, becoming yellowish towards the extremity of the tail. The underside of the head and breast is marbled gray, as is the upper side of the head, and about 26 or 28 transverse faint dorsal bands, which on the dirty cream-colour ground become more conspicuous as they approach the extremity of the tail; its colouring in short is exactly that of the gray Madrepores which it haunts, and into the cavity of which it retires when alarmed. The largest I have seen have been more than a foot long." This description of the colouring shows how it differs when alive from the specimens we have to examine in spirits.

They live on the sea-coast: for Mr. MacLeay, when speaking of the sandy shore behind the belt of coral reefs, observes, "Here gray lizards of different sizes with saffron bellies and tails curled in spiral, peep from under the dusky flat stones which are generally sea-broken and time-worn pieces of *Madrepores*."

TROPIDURUS.

3. *Tropidurus (Leiolæmus), Cubensis, n. s.*

Head shields many, keeled and imbricate. Scales of the back and sides broad rhombic, keeled; the keels forming oblique lines; back and tail slightly crested. Ears moderate with 3 or 4 scales in front. Temples with small keeled scales (discoloured) blueish chin and throat blueish white spotted; belly and underside of tail white. Two series of scales over the upper labial plates, the plate immediately under the eye of the upper series large, elongated. The underside of the toes with 3 or 4 keels.

ANOLIUS.

The genus *ANOLIUS* may be divided into genera and sections to facilitate the distinction of the species; and in making these divisions I have not adopted the characters used by MM. Dumeril and Bibron, as I found the table of the species given in their work of very little use to me for making out the species. Most of the specimens in our collection have the scales of the sides smaller than those of the back and belly, while these naturalists place only a single species as having this character.

The genus may be thus divided:—

I. *XIPHOSURUS, Fitzinger.*

The penultimate joint of the toes dilated, the back and tail with a

fin-like crest. Nostrils above the keel on the muzzle, the ventral shields imbricate.

1. *Xiphosurus velifer*. *Anolis velifer*, Cuv. R. A. t. 5. f. 1. A. Cuvieri, Merrem. Sides with a black spot.

2. *Xiphosurus Ricordii*. *Anolis Ricordii*, Dum. and Bibr. iv. 167. Sides with two broad black streaks.

II. DACTYLOA.

The penultimate joint of the toes dilated, the back and tail with a crest formed of a series of compressed scales; ventral scales flat, imbricate.

* *Scales small, granular, convex.*

1. *Dactyloa Edwardsii* = *Anolis Edwardsii*, Merrem, Edwards Glean. Head flat, shields keeled, green with 4 or 5 pale cross bands.

** *Scales large, flat, not imbricate.*

2. *Dactyloa equestris* = Le grand *Anolis à écharpe*, Cuv. R. A. ii. t. 5. f. 2. *Lacerta major e viridi cinerea dorso crista brevior donata*, Sloane Jam. 333. t. 232. f. 2. *Anolius equestris*, Merrem = *A. Rhodolæmus*, Bell Zool. Jour. ii. 285. t. 20. Supp. Head tubercular; shields conical, green; throat, pouch, and streak over the shoulder white.

Inhab. Cuba.

This species was first figured and described by Sloane in his History of Jamaica, and afterwards by Cuvier in his Animal Kingdom, and more lately Mr. Bell has described it as a new species under the name of *A. Rhodolæmus*. It appears to be common to several of the West Indian Islands as well as Cuba. Sloane's specimen was found in Jamaica.

"Basks on the trunks of trees in the same way as the next, called the *Chamæleon*, and may like it be made to live in confinement."—W. S. M.

III. CHAMÆLEOLIS, Cocteau.

The penultimate joint of the toes dilated, back and nape with a crest formed of a series of compressed scales. Ventral scales small, convex, granular.

1. *Chamæleolis Fernandinae*, "Coct. H. Nat. Cub., t. 12." = *Anolis Chamæleonides* Dum. and Bibr. iv. 168.

Inhab. Cuba.

This species was first described by Messrs. Dumeril and Bibron from specimens sent from Cuba by M. Sagra.

Like the *Chameleons* the chin and belly are crested beneath, but

the crest consists of two series of elongate scales; those on the chin are much larger than those on the belly.

"Found always basking on the trunks of trees in forests near the sea side on the north coast of Cuba. It generally basks with its head downwards and is exceedingly alert. It will live in confinement."—W. S. M.

IV. ANOLIS.

The penultimate joint of the toes dilated. Back and nape simple or with a low crest formed of two diverging series of short triangular scales. Ventral scales flat, imbricate.

The specimens of this genus which we have in the British Museum may be thus divided into groups and described.

A. Crest produced along the back.

a. *Tail much compressed, irregularly serrated above. Ventral scales square, smooth.*

1. *Anolis maculatus*. Scales of the back convex, of the sides smaller, granular; blueish, black-spotted; lips, streak over ears and shoulders white; and a streak from the back of the eyes, over the ears black.

Inhab. —.

b. *Tail compressed, regularly serrated above, and many keeled beneath. Ventral scales ovate, keeled.*

2. *Anolis occipitalis*. Scales of the back many-sided, keeled, of the sides smaller, elongate; brown, beneath blueish-white; occipital pit large, rounded, toothed, head shields smooth.

Inhab. West Indies. Presented by Thomas Bell, Esq.

c. *Tail subcompressed, slightly serrated above. Ventral scales square, smooth.*

3. *Anolis similis*. Scales of the back rather convex, of the sides rather smaller; olive green with a few black spots; head shields rather convex.

Inhab. —.

4. *Anolis Alligator* (Dumeril and Bibron, iv. 134?). Scales of the back polygonal, nearly flat, of the sides smaller; green scattered with white spots; head shields flat with two series of large close transverse convex shields between the eyes.

Inhab. —.

B. Crest only on the nape or wanting.

a. *The ventral scales ovate, keeled.*

* *Tail roundish without any central crest.*

5. *Anolis porcatus*. Scales of the back moderate, hexangular, keeled,

of the tail large, keeled, keels forming continued ridges; muzzle elongate with five very prominent keels; brown or green with irregular black cross lines on the back, and a streak on the side of the neck, beneath (and sometimes the dorsal line) silvery.

Inhab. Cuba and "Texas."

"Found on the leaves of trees jumping from branch to branch after insects. It is also found on garden walls lying in wait for flies."—Mac Leay, MSS.

**** Tail roundish with a slight central crest.**

6. *Anolis Richardii*, Dum. and Bibr. Herp. Scales of the middle of the back ovate, keeled, of the sides small, granular, of tail small, keeled; nape slightly crested; head short, muzzle shelving with four slight crests; blueish-grey, crown black, beneath whitish.

Inhab. —.

***** Tail compressed, slightly crested.**

7. *Anolis punctatus*. Scales of the back small, six-sided, keeled, of the sides rather smaller, similar; of the base of the tail small keeled; nape scarcely keeled; head depressed; head shields keeled; blue, white-spotted, belly and hind limbs whitish.

Inhab. —.

8. *Anolis nebulosa* = *Dactyloa nebulosa*, Wiegmann, *Herp. Mex.* A. Sagrei, Coct. = Dum. and Bibr. Herp. iv. Scales of the back rather rhombic, keeled; of the sides rather smaller, similar; of the tail and limbs larger, keeled; nape scarcely keeled; head short, shelving, shields keeled; pale brown (back of young with two series of triangular brown spots,); throat brown, lined.

Inhab. Cuba and Texas.

"On garden walls seeking for flies."—W. S. MacLeay.

9. *Anolis lineatopus*. Scales of the centre of the back small, slightly keeled; of the sides smaller, granular; head elongate; muzzle slightly four-keeled with strongly keeled scales; pale brown with five longitudinal paler streaks; sides of the tail varied with triangular spots; throat brown, lined.

Inhab. —.

Very like *A. nebulosa*, but the head is more depressed and with more keeled shields, and the scales are smaller.

10. *Anolis maculatus*, Gray. *A. marmoratus*, Gray MSS. not Dum. and Bibr. Scales of the middle of the back small, hexangular, keeled; of the sides smaller; of the tail and limbs larger, keeled; nape slightly keeled; head elongate; muzzle shelving, slightly four-

keeled ; shields elongate, keeled ; brown with transverse white spots or streaks ; head white spotted.

Inhab. —.

b. *Ventral scales keeled, square ; tail rather compressed, slightly crested.*

11. *Anolis stenodactylus*. Scales of the middle of the back small, elongate, keeled ; of the sides granular : nape slightly double-ridged ; muzzle depressed, slightly four-keeled, shield irregular ; toes very slender ; blueish, beneath whitish.

Inhab. Jamaica.

c. *Ventral scales smooth, subovate ; tail rather compressed, slightly crested.*

12. *Anolis reticulatus*. Scales of the middle of the back small, angular, keeled ; of the sides granular ; nape slightly 2-ridged ; ventral shields subovate ; muzzle depressed, slightly 4-keeled ; shields smooth ; blue, black spotted and varied ; throat brown, lined.

Inhab. —.

d. *Ventral scales smooth, four-sided ; tail rather compressed, slightly crested.*

13. *Anolis æneus*. Scales small, elongate, slightly keeled, rather smaller on the sides ; nape rounded ; muzzle depressed with a lozenge-shaped impression, shields smooth, flat ; shields between the eyes without any shields between them ; golden brown, black dotted, beneath yellowish, brown spotted.

Inhab. —.

V. DRACONURA, Wagler.

Penultimate joints of the toes slightly dilated ; back and nape not crested ; tail round.

1. *Draconura nitens*, Wagler. *Anolis refulgens*, Schn. Dum. and Bibr. iv. 91.

Inhab. —.

VI. NOROPS, Wagler.

Toes not dilated, the fourth longer than the third ; scales many, keeled, imbricate, of the sides smaller ; back and tail not crested.

1. *Norops auratus*, Wagler. *Anolis auratus*, Daud. iv. 69.

Inhab. —.

AMIEVA.

8. *Amieva trilineata*. Abdominal plates ten-rowed ; olive brown with 3 very narrow distinct silvery lines, with a series of irregular black spots on the upper part of the sides, beneath silvery ; a band of small granular scales between the lower labial and the gular shields.

Young with three distinct streaks on the back, the central one being rather the broadest; the upper part of the sides with black net-work leaving a series of round olive spots.

Inhab. Cuba.

This species differs from all the other species of the genus we have in the British Museum in colour as well as in the peculiarity of the band of granular sides between the lateral and gular shields.

"Found under large stones in woods, and always on the ground looking for insects under the brushwood."—W. S. M.

ALLIGATOR.

9. *Alligator fissipes*. Caiman fissipes, *Spix. Braz. t. 3*. *Champsia fissipes*, *Wagler Icon. t. 17*.

Alligator Sclerops, *Br. Max. Abild. Braz. t. 69*. *Crocodylus Sclerops*, *Schinz. Nat. Rept. t. 12*. copied from *Pr. Max.*

Alligator Cynocephalus, *Dum. and Bibr. Rept. iii. 87*.

"Occurs sometimes 25 feet long."—W. S. M.

TESTUDO.

10. *Gopher Tortoise*, *Bartram. Testudo Polyphemus*.

Inhab. Cuba.

Lives in domestication.

AMPHISBÆNA.

11. *Amphisbæna punctata*, *Bell Zool. Journ. iii.*

Inhab. Cuba.

XIV.—*Characters of Five new Species of Orchidaceous Plants from Dominica.* By Prof. LINDLEY.

IN a small but interesting collection of dried plants of *Orchidaceæ*, collected in the island of Dominica, for the possession of which I am indebted to Prof. Henslow, there are the following new species.

1. *STELIS scabrida*; folio oblongo bidentato marginato basi cuneato caule longiore, racemo filiformi stricto folio longiore, bracteis ovatis amplexicaulibus acutissimis, petalis vertice scabridis labelloque lævi truncatis, antherâ pubescente.
2. *PLEUROTHALLIS aristata**; cæspitosa, folio ovali acuto

* Since this was in type, I have found this plant described and figured, under the same name which had been given it by me, in the 2nd volume of this work, p. 329, t. 15, by Sir W. Hooker. There are however differences enough between the two definitions to induce me to let my own remain.

- apiculato basi angustato caule longiore, racemo capillari flexuoso erecto 4—6-floro folio ter longiore, bracteis vaginantibus cuspidatis, pedicellis elongatis, sepalis aristatis subciliatis lateralibus semiconnatis, petalis lanceolatis acuminatis semipinnatifidis duplò brevioribus, labello lineari glanduloso-hispido apice rotundato basi glabro utrinque auriculato.—Flowers purple, apparently streaked with yellow.
3. *CAMARIDIUM inflexum*; caule elongato subramoso pseudobulbifero, foliis geminis inæqualibus coriaceis oblongis basi canaliculatis, floribus solitariis, sepalis petalisque ovatis acutis, labello concavo erecto trilobo: laciniis membranaceis lateralibus inflexis falcatis serrulatis intermediâ subrotundâ leviter emarginatâ basi tuberculatâ.—Leaves about 2 inches long.
4. *RODRIGUEZIA cochlearis*; pseudobulbis subrotundis compressis monophyllis cæspitosis, foliis oblongis sessilibus horizontalibus racemo erecto radicali subcorymboso paucifloro duplò brevioribus, sepalo supremo cum petalis obtuso lateralibus acutis semiconnatis brevioribus, labello obovato cochleari obtuso basi cristâ hippocrepicâ utrinque elongatâ bicarinato.—Flowers apparently yellow.
5. *PELEXIA bursaria*; caule elongato folioso, foliis ovato-lanceolatis petiolatis, petiolis basi vaginantibus, scapo rachi ovarisque pilosis, bracteis membranaceis acuminatis pilosis ovarii longitudine, labello indiviso apice glanduloso, calcare inflato obtuso ovario paulò brevioribus.—A fine species with the habit of *Goodyera procera*. Stem from 1—1½ feet high.

XV.—*Information respecting Botanical and Zoological Travellers.*

Mr. Gould's Expedition to examine the Zoology of Australia.

WE have received a letter from Mr. Gould written from the banks of the Hunter river; and having his permission to make such extracts from it as we may consider interesting to our readers, it gives us sincere pleasure to be able to state that the expedition of this orni-

thologist and naturalist has hitherto been attended with the most signal success ; and we have no doubt, if spared to complete his intended voyage to New Zealand, that the information and collections gained will be of the most important and valuable kind. His remarks on the habits of *Menura* and *Cinclosoma* will be read with much interest by the ornithologist.

“ Maitland, River Hunter, N. S. Wales, Sept. 28, 1839.

“ You may readily imagine the extreme gratification I feel in visiting this fine country, teeming as it does with so many interesting and beautiful productions. My success up to the present time has been greater than I could have anticipated, both in obtaining much information that is entirely new, and in bringing together one of the finest collections that has ever been formed. I have as a matter of course made a point of attending to those particulars which have hitherto been overlooked, not only by collecting the birds in their various changes of plumage, but by preserving all the principal forms for dissection, as well as by preparing skeletons of the same in the country. I have also made the quadrupeds a particular object of my attention, and have extensive collections in this department; and I hope to possess myself of sufficient information before my return to enable me to clear up the confusion which exists with regard to the kangaroos, &c.

“ Six months ago I sent a short summary of my proceedings to the Zoological Society *, with the characters of some new species of birds, since which I have visited South Australia, a part that has afforded me more novelties than any other. This journey has also enabled me to draw some very important conclusions relative to the range of a number of species; the absence of those found on the sea side of the great ranges in New South Wales being particularly striking, while those which inhabit Liverpool plains are also found in South Australia. Out of two and a half months' visit to this part, I spent five weeks entirely in the bush in the interior, partly on the ranges and partly on the belts of the Murray. To give you a detailed account of all the new species I have discovered would occupy too much time at this moment: some of the more interesting are as follows: A new form of the gallinaceous birds nearly allied to *Tinnamus*, but scarcely larger than an English sparrow or half the size of a quail; it is in fact a diminutive bustard with a hind toe. A new and beautiful *Cinclosoma*, which I intend calling *castanotus* from a

* This will be found among the Proceedings of the Society in our present Number, p. 139.

rich chestnut mark on the back and rump, in other respects very like my *C. punctatum*, and precisely of the same generic form. These birds differ more in habits and œconomy from the true thrushes than their outward appearance indicates; the *C. punctatum* gives preference to rich scrubby brushwood, depending for security more on the speed with which it runs than upon its powers of flight, which are limited; its carelessly constructed nest is placed on the ground; the eggs, two in number, are of a large size; the young run immediately after they are hatched: all but the last fact I have myself verified, and I received it from such authority as leaves little doubt in my own mind upon the subject; when flushed it makes the same burring noise as the quail and partridge, and has a whistling note somewhat resembling that of the former. What a beautiful analogy, you will say, does this bird present in its own circle to the *Rasores*! Two species of *Ptilotis*; a bird whose form approaches nearly to *Orpheus*; two species of *Sericornis*, &c.

“From the head of lake Alexandrina northwards, for the distance of nearly a hundred miles, and in breadth nearly thirty or forty, appears from the top of the range to be one flat or dead level covered with low shrub-like trees, of a character quite different from any I have seen elsewhere, particularly that portion which lies at the foot of the eastern range. They are of the most beautiful and singular forms that can be imagined; this is succeeded by a belt of dense dwarf *Eucalypti*, through the centre of which the river Murray winds its course, the banks only being studded with Gums of another and larger species.

“Through the kindness of Col. Gawler, the Governor, and Capt. Sturt, whom I accompanied into the interior on an especial expedition of survey, I was provided with horses, a cart, and a small company, with the view of reaching the Murray. Having with difficulty crossed the range over an entire new country, and penetrated to the centre of the dense *Eucalypti* scrub alluded to, in which I spent a night and part of two days without water for my horses, I was compelled, much to my regret, to beat a retreat back to the ranges, in the gullies of which I even found a difficulty in obtaining water. During a week’s stay under the ranges I made daily visits to this rich arboretum, which would have served me to investigate until this time without exhausting its treasures; but, alas! our provisions failing, we were obliged to retrace our steps, and after visiting Kangaroo Island I returned to New South Wales in order to carry out another expedition to the interior. Nearly a fortnight was occupied in Sydney in preparing for the journey. My men proceed with the drays to

the upper part of the Hunter, near the Liverpool range; but this being Saturday I follow on Monday, and from the slow travelling shall soon overtake the party. I am sure you would be delighted to spend a week among the *Menuras*, as I hope to do, it being my intention to encamp near their haunts, in order if possible to obtain their eggs and learn something of their habits and nidification. I paid a short visit to Liverpool Range last winter, and obtained seven or eight specimens; of two I made skeletons, and placed three entire bodies in pickle for dissection. In its œconomy and structure the *Menura* bears little or no relation to the Gallinaceæ; its sternum is quite plain with a small ridge; it is a cheerful bird, singing and mocking all the birds of the forest; and of all creatures I have encountered it is the most shy and wary, and difficult to procure, inhabiting precipitous rocky gullies covered with climbing plants and dense vegetation. I find the natives very useful in assisting, being scarcely ever without a tribe or portion of a tribe with me when in their neighbourhood; they are nearly all excellent and dead shots, and are excessively fond of shooting. I frequently give into their hands my best guns, and never find them in the slightest degree disposed to take advantage: I am of course not speaking of those far in the interior, where I shall require to be strictly on the alert."

Mr. Gould also writes that he had sent his principal assistant to Swan River, and has already received from him a large and valuable collection. He expresses an intention of endeavouring to visit New Zealand before returning to Britain, and it will be satisfactory to all his friends and well-wishers to know that at the date of the above letter he and Mrs. Gould continued to enjoy uninterrupted good health.

Extracts from a Journal of the Mission which visited Bootan, in 1837-38, under Captain R. BOILEAU PEMBERTON. By W. GRIFFITH, Esq., Madras Medical Establishment.

[Continued from vol. iv. p. 429.]

FEB. 1st. Our march commenced by descending, gradually at first and then very rapidly, to the Dumree Nuddee; crossing this, which is of small size, at the junction of another torrent, we wound along the face of the mountain forming the right wall of the ravine, ascending very gradually at the same time. The country throughout was of a most barren appearance, the vegetation consisting of coarse grasses, stunted shrubs, and an occasional long-leaved pine.

Feb. 5th. On leaving this place we descended by a precipitous

path to the Monass, which we crossed by a suspension bridge, the best and largest, I suspect, in Bootan. The bed of this river, which is of large size (the banks which are mostly precipitous being sixty or seventy yards asunder) and of great violence, is 1300 feet below Benka. We then commenced ascending very gradually, following up the north side of the ravine, until we reached Nulka: the march was a very short one. The country was perhaps still more barren than any we had hitherto seen, scarcely any vegetation but coarse grasses occurring. Near Nulka the long-leaved pine recommenced. We passed two miserable villages scarcely exceeded by Nulka, in which we took up our abode. No cultivation was to be seen, with the exception of a small field of rice below Nulka.

Feb. 6th. We descended to the Monass, above which Nulka is situated 600 or 700 feet, and continued along its right bank for a considerable time, passing here and there some very romantic spots, and one or two very precipitous places. On reaching a large torrent, the Koollong, we left the Monass, and ascended the former for a short distance, when we crossed it by a wooden bridge. The remainder of the march consisted of an uninterrupted ascent up a most barren mountain, until we reached Kumna, a small and half-ruined village, 4300 feet above the sea. Little of interest occurred: we passed a small village consisting of two or three houses and a religious building, and two decent patches of rice cultivation. The vegetation throughout was almost tropical, with the exception of the long-leaved fir, which descends frequently as low as 1800 or 2000 feet. I observed two wretched bits of cotton cultivation along the Monass, and some of an edible *Labiata*, one of the most numerous make-shifts ordinarily met with among Hill people.

Feb. 7th. Left for Phullung. We ascended at first a few hundred feet, and then continued winding along at a great height above the Koollong torrent, whose course we followed, ascending gradually at the same time, until we reached our halting-place. As high as 5000 feet the Kumna mountain retained its very barren appearance; at that elevation stunted oaks and rhododendrons commenced, and at 5300 feet the country was well covered with these trees, and the vegetation became entirely northern.

Feb. 8th and 9th. We were detained partly by snow, partly by the non-arrival of our baggage. On the 9th I ascended to a wood of *Pinus excelsa*, the first one I had noticed, and which occurred about 1000 feet above Phullung. The whole country at similar elevations was covered with snow, particularly the downs which we passed after leaving Bulphei. Tassgong was distinctly visible. The woods were

otherwise composed of oaks and rhododendrons. At Phullung they were endeavouring to keep alive the wild indigo of Assam ; a species of *Ruellia*, but its appearance showed that it was unsuited to the climate. The country about Tassangsee is picturesque, with large woods of *Pinus excelsa*, which here has much the habit of a larch ; a few villages are visible on the same side of the Koollong, and a little cultivation. The place is said to be famous for its copper manufactures, such for instance as copper caldrons of large dimensions ; but I saw nothing indicating the existence of manufactures, unless it were a small village below the castle, and on the same side of the Koollong, which looked for all the world like the habitation of charcoal burners. Snow was visible on the heights around, and especially on a lofty ridge to the north. We found Tassangsee to be very cold, owing to the violent south or south-east winds ; the thermometer however did not fall below 34°. Its elevation is 5270 feet, the vegetation entirely northern, consisting of primroses, violets, willows, oaks, rhododendrons, and pines ; very fine specimens of weeping cyprus occur near this place.

Feb. 14th. Snow became plentiful as we approached Sanah. This we found to be a ruined village, only containing one habitable house. It is situated on an open sward, surrounded with rich woods of oaks and rhododendrons, yews, bamboos, &c. Its elevation is very nearly 8000 feet.

Feb. 15th. We started at the break of day, as we had been told that the march was a long and difficult one. We proceeded at first over undulating ground, either with swardy spots, or through romantic lanes ; we then ascended an open grassy knoll, after passing which we came on rather deep snow. The ascent continued steep and uninterrupted until we reached the summit of a ridge 11,000 feet high. Although we had been told that each ascent was the last, we found that another ridge was still before us, still steeper than the preceding one, and it was late in the day before we reached its summit, which was found to be nearly 12,500 feet. Above 9500 feet, the height of the summit of the grassy knoll before alluded to, the snow was deep ; above 10,000 feet all the trees were covered with hoar-frost, and icicles were by no means uncommon. The appearance of the black pines, which we always met with at great elevations, was rendered very striking by the hoar-frost. Everything looked desolate, scarce a flower was to be seen, and the occasional fall of hail and sleet added to the universal gloom. The descent from the ridge was for the first 1500 feet or thereabout, most steep, chiefly down zigzag paths, that had been built up the faces of pre-

cipices ; and the ground was so slippery, the surface snow being frozen into ice, that falls were very frequent, but happily not attended with injury. It then became less steep, the path running along swardy ridges or through woods. In the evening I came on the coolies, who had halted at a place evidently often used for that purpose, and who positively refused to proceed a single step further. But as Captain Pemberton and Lieut. Blake had proceeded on, I determined on following them, hoping that my departure would stimulate the coolies to further exertions. After passing over about a mile of open swardy ground I found myself benighted on the borders of a wood, into which I plunged in the hopes of meeting my companions ; after proceeding for about half an hour slipping, sliding, and falling in all imaginable directions, and obtaining no answers to my repeated halloos ; after having been plainly informed that I was a blockhead by a hurkarah, who as long as it was light professed to follow me to the death—"Master go on, and I will follow thee to the last gasp with love and loyalty"—I thought it best to attempt returning, and after considerable difficulty succeeded in reaching the coolies at $8\frac{1}{2}$ P.M., when I spread my bedding under a tree, too glad to find one source of comfort. I resumed the march early next morning, and overtook my companions about a mile beyond the furthest point I had reached ; and as I expected, found that they had passed the night in great discomfort. We soon found how impossible it would have been for the coolies to have proceeded at night, as the ground was so excessively slippery from the half-melted snow and from its clayey nature, that it was as much as they could do to keep their legs in open day-light. We continued descending uninterruptedly, and almost entirely through the same wood, until we reached Singé at $9\frac{1}{2}$ A.M. The total distance of the march was 15 miles—the greatest amount of ascent was about 4500 feet, of descent 6100 feet. We remained at Singé up to the 18th, at which time some coolies still remained behind. On the night of the 17th snow fell all around, though not within 1000 feet of Singé. The comparative mildness of the climate here was otherwise indicated by the abundance of rice cultivation about and below it. It stands on the border of the wooded and grassy tracts so well marked in the interior of Bootan, at least in this direction, and about midway on the left side of a very deep ravine, drained by the river Koosee. On both sides of this villages were plentiful ; on the opposite or western side alone I counted about twenty ; about all there is much cultivation of rice and wheat ; the surface of the earth where untilld being covered with grassy vegetation and low shrubs.

Feb. 18th. After arriving at the Koosee the country became barren, resembling much that about Tassgong, and the only cultivation we passed in this portion of the march was some rice along the bed of that river. The village itself is a poor one, most of the inhabitants being quartered in the castle. We had an interview with the Soobah in an open place close to the village : it was conducted with much less state than that at Tassgong. We found the Soobah to be very young, in fact almost a boy ; he behaved civilly and without any pretension. There is but little cultivation about this place, which is 4520 feet above the sea, and the surrounding mountains are very barren. About the village I noticed a few stunted sugar-canes, some peach and orange trees, the castor-oil plant, and a betel vine or two. The only fine trees near the place were weeping cypresses ; the simul also occurs.

Feb. 23rd. After the usual annoyances about coolies and ponies, we left Singlang without regret, for it was a most uninteresting place. We commenced by an ascent of about 1000 feet, and then continued following the course of the Koosee *downwards*. The road throughout was good and evidently well frequented. At an elevation of about 6000 feet we came on open woods of somewhat stunted oaks and rhododendrons ; the only well-wooded parts we met with being such ravines as afforded exit to water-courses. We passed several villages in the latter part of the march, some containing 20 and 30 houses, and met with a good deal of cultivation as we traversed that tract, the improved appearance of which struck us so much from Singé. Tumashoo is an ordinary-sized village, about 5000 feet in elevation. We were lodged in the Dhoompá's house.

Feb. 24th. Left for Oonjar, ascending at first over sward or through a fir wood for about 800 feet, when we crossed a ridge, and thence descended until we came to a small torrent which we crossed ; thence we ascended gradually, until we surmounted a ridge 7300 feet high ; descending thence very gradually until we came over Oonjar, to which place we descended by a steep by-path for a few hundred feet. The features of the country were precisely the same. At the elevation of 7300 feet the woods became finer, consisting of oaks and rhododendrons, rendered more picturesque from being covered with mosses, and a gray pendulous lichen, a sure indication of considerable elevation. Various temples and monumental walls were passed, and several average-sized villages seen in various directions. A fine field of peas in full blossom was noticed at 5500 feet, but otherwise little cultivation occurred. Oonjar is a small village at an elevation of 6370 feet.

Feb. 25th. Leaving this place, we continued winding along nearly at the same altitude until we descended to the river Oonjar, which drains the ravine, on the right flank of which the village is situated. This river, which is of moderate size, is crossed twice within 200 yards. From the second bridge one of the greatest ascents we had yet encountered commenced; it was excessively steep at first, but subsequently became more gradual. It only terminated with our arrival at the halting-place, which we denominated "St. Gothard," but which is known by the name Peemee. Its elevation is about 9700 feet, and we had ascended from the bridge as much as 4350 feet. Snow commenced at 7500 feet, and became heavy at 8500 feet.

Feb. 26th. We continued the ascent through heavy snow. For the first 1000 feet it was easy enough, but after that increased much in difficulty. Great part of the path was built up faces of sheer precipices. The remainder of the ascent was very gradual, but continued for about $1\frac{1}{2}$ mile; and I consider the actual pass from which we commenced descending to be at least 12,600 feet. The descent was at first very rapid, passing down the bold face of the mountain, which was covered entirely with stout shrubby rhododendrons. We then descended gradually through a fine wood of the black fir. On recommencing the steep descent we passed over swardy patches surrounded by fir woods, and we continued through similar tracts until within 1000 feet of our halting-place, to which we descended over bare sward. From the summit of Rodoola a brief gleam of sunshine gave us a bird's-eye view of equally lofty ridges running in every direction, all covered with heavy snow. The vegetation of the ascent was very varied, the woods consisting of oaks, rhododendrons, and bamboos, up to nearly 11,000 feet. Beyond this the chief tree was the black fir; junipers, alpine polygonums, a species of rhubarb, and many other alpine forms presented themselves in the shape of the withered remains of the previous season of active vegetation. That on the descent was less varied, the trees being nearly limited to three species of pines, of which the black fir scarcely descended below 11,600 feet, when it was succeeded by a more elegant larch-like species, which I believe is *Pinus Smithiana*; this again ceased towards an altitude of 9500 feet, when its place was occupied by *Pinus excelsa*, now a familiar form. We found Bhoomlungtung to occupy a portion of rather a fine valley. The valley is for the most part occupied by wheat fields, but the prospect of a crop appeared to me very faint. Two or three villages occur close to Bhoomlungtung. The tillage was better than any we had seen, the fields being

kept clean, and actually treated with manure, albeit not of the best quality; in a few instances they were surrounded with stone walls, as were the court yards of all the houses, but more commonly the inroads of cattle were considered sufficiently prevented by strewing thorny branches here and there. With the exception of a sombre looking oak near Bhoomlungtung, and some weeping willows, the arboreous vegetation consists entirely of firs. The shrubby vegetation is northern and so is the herbaceous, but the season for this had not yet arrived. It was here that I first met with the plant called after Mr. James Prinsep; the compliment is not, in Bootan at least, enhanced by any utility possessed by the shrub, which is otherwise a thorny, dangerous looking species. Here too we first saw English looking magpies, larks, and red-legged crows.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

Observations on the Blood Corpuscles, or Red Particles, of the Mammiferous Animals. By George Gulliver, F.R.S., F.Z.S., Assistant Surgeon to the Royal Regiment of Horse Guards.—*Memoirs in the London and Edinburgh Philosophical Magazine for Jan. Feb. and March 1840.*

As we fully concur in the justice of the author's remark, that a complete history of the blood-corpuscles would form a very acceptable addition to anatomical and zoological science, we proceed to give a short abstract of his observations, referring such of our readers as may be desirous of more complete information on the subject to his original memoirs.

To persons who are but imperfectly acquainted with the blood corpuscles, it might appear that these bodies are mere microscopic curiosities, rather to be classed with some of the apocryphal "wonders of the microscope" than regarded as objects of sober philosophic research. However, some of the most distinguished philosophers of the present day have expressed their conviction of the importance of the red particles of the blood, and we conceive that this view derives additional force from the fact that these curious bodies have now been observed and found to possess regular and determinate forms in no less than 136 different species of the class mammalia alone, for such is the number in which Mr. Gulliver has already measured and examined the blood corpuscles. They had only been described in a few of the mammalia previously to the publication of his researches; but as he promises to continue his observations, and Professor Wagner and M. Mandl, besides some other eminent physio-

logists, have been or still are engaged in a similar line of inquiry, we have good reason to hope that this interesting branch of comparative anatomy will soon receive much of the illustration of which it may be susceptible from the improved resources of modern science.

Of the 136 species in which Mr. Gulliver has at present described the blood corpuscles in the class mammalia, the following table will exhibit at one view the number in each order.

Quadrumana	31
Cheiroptera	1
Feræ	38
Marsupialia	6
Glires	19
Edentata	1
Pachydermata	9
Ruminantia	31
Total	136

1. *Quadrumana*. The corpuscles seem to differ but little from those of man.

2. *Cheiroptera*. In the bat the average diameter of the particles is about $\frac{1}{4300}$ th of an inch, a very common size it seems of the corpuscles among the mammiferous animals generally.

3. *Feræ*. The average-sized corpuscles of this order appear to be generally between $\frac{1}{3000}$ th and $\frac{1}{4000}$ th of an inch in diameter. In the *seal* and *dog* they are a little larger; and in the *Javanese Ichneumon* they seem to be as small as in any of the carnivora. In the larger species of the genus *Felis*, as the lion, tiger, and puma, the blood particles are very nearly alike in all respects; and the corpuscles in the smaller species, as the cat, serval, &c. are much of the same diameter, the blood disks in the cat being very slightly smaller than those of the tiger.

4. *Marsupialia*. The blood corpuscles in the interesting animals of this order presented nothing peculiar. The average diameter appears to be between $\frac{1}{4300}$ th and $\frac{1}{3300}$ th of an inch.

5. *Glires*. The common-sized corpuscles appear to be comprehended between $\frac{1}{4300}$ th and $\frac{1}{3200}$ th of an inch in diameter. Of the nineteen species examined nothing remarkable was seen in the blood particles, except some of very small size, though of regular form, in certain species of the genus *Sciurus*. These little disks Mr. Gulliver thinks deserving of further attention.

6. *Edentata*. In the weasel-headed armadillo the blood corpuscles presented nothing unusual; their most common diameter was from $\frac{1}{4000}$ th to $\frac{1}{3200}$ th of an inch.

7. *Pachydermata*. In the elephant the average-sized corpuscles appear to be $\frac{1}{2700}$ th of an inch in diameter, which is larger than any at present known in the mammalia. But to show how little relation there is between the size of the animal and that of its blood disks, the author mentions that they are smaller in the horse than in the mouse; and suggests that those who have the opportunity should examine the blood of the larger *Cetacea*,—a hint which we hope will not be lost to zoologists residing near the sea coast either at home or in the colonies. In the rhinoceros the blood corpuscles appear to be about $\frac{1}{4000}$ th of an inch in diameter, and they are of much the same size in the pig and in the peccary.

8. *Ruminantia*. It is in this order that the most novel and interesting results were obtained. The blood corpuscles of the goat were the smallest known to physiologists before the publication of the author's observations; but in the genus *Moschus*, as it appears from his examination of the blood of the Napu musk deer (see Dublin Medical Press, Nov. 1839, and Annals of Natural History, Dec. 1839), the particles are singularly minute and yet very regular in size and definite in form. He fixes their most common diameter at $\frac{1}{13000}$ th of an inch. In the *Vicugna* and *Guanaco* he shows that the blood disks have a very distinct oval shape, as M. Mandl had previously observed in the dromedary and paco. In Reeves's Muntjac and some other species of the genus *Cervus*, besides many of the common circular disks, the author announces the existence of certain oblong corpuscles of very peculiar appearance and forms, generally lunated or crescentic, with acutely pointed ends, but altogether singularly variable in shape.

Genera et Species Staphylinorum Insectorum Coleopterorum familiae.

Auctore Guil. F. Erichson, &c. &c. Pars prior, accedunt tab. æn. 3. pp. 400. 8vo. Berol. 1839.

The above is the title of an elaborate work executed by Dr. Erichson upon the obscure family of the *Staphylini*. We much rejoice that this difficult task has fallen into such able hands, the careful accuracy of his previous works being a sure guarantee for the successful accomplishment of the present. Since the publication of the monographs of Gravenhorst at the commencement of this century, the most extensive discussion of the family is the abridgement of Mr. Kirby's incorporated by Mr. Stephens in his 'Illustrations of British Entomology,' and we much regret to observe that Dr. Erichson should not have sufficiently controlled national prejudices to do justice to his British fellow-labourers, who notwithstanding the many imperfections of their work, certainly deserve more attention than

Dr. E. has chosen to bestow upon them. The consequence of this will be that very many of the names that Dr. E. has imposed must upon the further elaboration of the family fall into synonyms by those very laws of priority to which in some of his preceding works he has so inflexibly adhered by restoring Fabrician names, upon his consultation of the Fabrician cabinet, to insects which had been renamed subsequently by others owing to the imperfection of the original Fabrician diagnostics. This manifestly evinces very unscientific caprice; for surely the characters in Stephens's work are *never less* characteristic than those in Fabricius, and he therefore has an equal claim to the priority which his date of publication gives him. But time and common justice will set this affair to rights. We cannot here go into a detailed examination of the work before us. It will suffice to observe that a second part is to complete it, which was promised to have been published ere this,—and that it embraces all the *Staphylini*, exotic as well as European. The generic and specific characters are very carefully drawn, and the former aided by figures of the trophi, and in a few instances of the insects themselves. The work as far as yet published comprises an introductory generalization upon their natural characters, affinities, external structure, internal structure, metamorphoses, habits of life, geographical distribution, history of their systematic arrangement, and this is followed by the author's distribution into eleven tribes, viz. 1. Aleocharini; 2. Tachyporini; 3. Staphylinini; 4. Pæderini; 5. Pinophilini; 6. Stenini; 7. Oxytelini; 8. Piestini; 9. Phlæocharini; 10. Omalini; 11. Proteinini. A tabulation follows of the genera comprised in these tribes, and this is succeeded by the body of the work, and the portion now published includes the first two tribes and a part of the third: on its completion we shall enter more into detail upon the subject.

The Petrified Insects of Solenhofen, described by Professor Germar of Halle, with Three Lithographic Plates. In the Nova Acta Physico-Medica Academiae Cæs. Leopold. Carol. Naturæ Curiosorum. Vol. XIX. Pt. I.

The learned Professor, whose labours in entomology the lovers of sound science can well appreciate, gives us here an account of 18 insects discovered in the limestone formation of Solenhofen. He had previously described 25 from the lignite of Rod and Arzberg in the Seven Mountains on the Rhine and of Bayreuth. The paper is accompanied by twenty lithographic figures, which greatly assist the descriptions, and indeed without which the latter would be al-

most useless. We should much like, for the sake of our geological as well as entomological readers, to give a translation of his prefatory observations, which contain a synopsis of all that is yet known of fossil entomology, and also many useful observations directing us in the determination of the existence of insects without their actual presence ; and in methods for facilitating the discovery of collateral evidence of the same fact : to this however we may possibly return, as it is a subject replete with interest. The application of trivial names to such mutilated remains is a vain and hopeless endeavour to enlarge our knowledge of species, and can scarcely answer any end, especially when we reflect what nice discrimination is frequently required to determine *recent* species, in the best state of preservation ; and in a fossil state the same individual species, from the variety of states of preservation in which it may come down to us, would be thus propagated into as many species, from their presenting no tangible means of identification. All therefore that we can reasonably hope for in fossil entomology is a knowledge of the genera peculiar to certain geological formations and their contemporaneous zoology and botany. Of course it will be understood that we exclude from this sweeping condemnation insects preserved in amber and copal, in which substances they usually retain their pristine perfection. We must however be thankful that this uninviting task has fallen into hands which can enliven with great interest a subject apparently so barren.

Transactions of the Berwickshire Naturalists' Club.

The unassuming Transactions of this locally useful Club, printed for private circulation among its members and their friends, has been kindly forwarded to us. The exertions of the Club are continued, and we now have the result of their labours during 1839, commencing with the Annual Address of the President, the Rev. T. Knight, Vicar of Ford.—Next a “ Notice regarding the Cessation of the Flow of the river Teviot ” on 27th Nov. 1838 ; by Dr. Douglas of Kelso : which proves that it was occasioned by accumulation of ice.—“ On the effects produced on Animal and Vegetable Life by the Winter of 1838 ; ” by P. J. Selby, Esq. of Twizel House : a Paper very interesting to compare with the season in other parts of Britain and Ireland.—“ Meteorological Observations made at the Abbey St. Bathon's, Berwickshire.”—“ On the Metamorphosis of *Balanus punctatus* of Montague ; ” by the Rev. T. Riddel, Fellow of Trinity College, Cambridge.—“ A description of the Cephalopoda which inhabit the coast of Berwickshire ; ” by Dr. Johnston.—“ On the Nests of the Fifteen-spined Stickleback, or *Gasterosteus spinachia* of Linnæus.”—

“ Notice of a curious Aquatic Larva found in a water-jug at Twizel ;” by P. J. Selby, Esq.—“ Case of Andrew Mitchel, aged 10 years, from whose nose Larvæ of a coleopterous Insect were discharged.”—“ Notice of the *Myliobates Aquila* of Cuvier, or Eagle Ray of Yarrell ;” by Dr. Johnston : a specimen has been taken in Berwick Bay.—“ Contributions to the Flora of Berwickshire ;” by Mr. James Hardy.

We have been much interested by the narratives of the periodical excursions of the Members of the Club. They present to our view a most delightful means of instructive intercourse and pleasing recreation, in which we see the clergy and members of the medical profession assisting their neighbours in the promotion of a love for the study of nature, and joining them in the investigation of the districts in which it is their lot to reside. The example is well worthy of imitation.

PROCEEDINGS OF LEARNED SOCIETIES.

LINNÆAN SOCIETY.

Feb. 18.—The Lord Bishop of Norwich, President, in the Chair.

Mr. George T. Fox, F.L.S., exhibited a specimen of the *Phrynosoma cornutum* (*Agama cornuta* of Harlan) from Texas.

Mr. Cameron, A.L.S., presented a specimen of a new fern (*Cibotium Baromez*, J. Sm.) which has lately borne fructification, for the first time in this country, in the garden of the Birmingham Horticultural Society. A description of the plant by Mr. Westcott accompanied the specimen. The fern has been cultivated for some years in the gardens as the *Agnus Scythicus* or Vegetable Lamb (*Polypodium Baromez*, Linn.), but whether identical with the plant of Linnæus is a question still undetermined, as there happens to be no specimen in his herbarium, and the description alone is too meagre to settle the point. Mr. Westcott is however in possession of a specimen of a fern collected in Mexico by Mr. Ross, which closely resembles the plant of the gardens, and should they prove to be identical, all doubt will be removed as to the claims of the present plant to be regarded as the *Baromez* of Linnæus, which is a native of China.

The following is Mr. Westcott's description of the species :—

Rhizoma densely clothed with yellow woolly articulated hairs. *Stipes* about 7 feet high, roundish, of a dark reddish brown colour, more or less covered with tufts of woolly hairs near the base, naked for about half its height : upper part flexuous from the point where the pinnae commence. *Fronde* bipinnate ; *pinnae* alternate, ovate-lanceolate, acuminate, smooth, under surface glaucous, upper surface

dark green ; those pinnæ bearing the sori curved, the barren pinnæ straight ; *pinnulæ* pinnatifid, alternate, linear-lanceolate, acuminate ; upper ones decurrent ; lower ones shortly petiolate ; lobes oblong, sharply serrated, more or less truncated, acute ; margins somewhat revolute, lobes in the upper row of each pinnula somewhat larger than those of the lower row, and those nearest to the rachis in the upper row the largest of all. *Venation* in the barren pinnæ branched, in the fertile pinnæ simple ; veins alternate. *Indusia* pouch-like, coriaceous sessile, situate on the apex of a vein at the margin, and near the base of the lobe of the pinnula : dehiscence by a transverse slit near the apex ; outer valve white, inner valve brown, and forming a persistent operculum or lid. *Thecæ* roundish, stipitate, half surrounded by an articulated ring. *Sporules* numerous, angular.

Read, " Observations on a certain Crystalline Matter found on the recently cut surfaces of the Wood of the Red Cedar." By Edwin J. Quekett, Esq., F.L.S.

Mr. Quekett remarked, that on the recently cut surfaces of the wood of the Red Cedar (*Juniperus virginiana*) a crystalline matter is observed to form, which puts on the appearance of a mouldiness, but which, when viewed with a magnifying glass, is seen to consist of innumerable extremely minute crystals of an acicular form. The substance was observed to form on the duramen or heart wood only, and not universally, but in patches. It is easily volatilized by heat, and gives out the well-known odour of the wood. Mr. Quekett showed that the duramen of the red cedar contains an abundance of a concrete volatile oil, on which the peculiar odour depends, and that the crystalline substance is a compound formed between the air and the oil, for when the latter was obtained from the wood, and exposed to the action of the air, it was soon also found to be covered with the same acicular crystals. This substance, which possesses many of the properties of benzoic acid, Mr. Quekett considers new, and he proposed for it the name of Cedarine.

March 3.—Mr. Brown, V.P., in the Chair.

Mr. Ward, F.L.S., exhibited a specimen of the *Agnus Scythicus*, or Vegetable Lamb, from the collection of the Apothecaries' Company.

Read, " A Note on the Fern known as *Aspidium Baromez*." By Mr. John Smith, A.L.S.

This plant, of which a description by Mr. Westcott was read at the preceding Meeting, and of which an abstract has been given, was shown by Mr. Smith to be a legitimate species of the genus

Cibotium, with which it agrees in the venation of its frond, the disposition of its sori, and in the structure and texture of its indusium.

March 17.—Mr. Forster, V.P., in the Chair.

Addresses of congratulation to Her Majesty and to His Royal Highness Prince Albert of Saxe Coburg and Gotha, on occasion of Her Majesty's marriage, were read from the Chair, and unanimously adopted by the Meeting.

Read "On some new Brazilian Plants allied to the Natural Order *Burmanniaceæ*." By John Miers, Esq., F.L.S.

Of the thirteen recorded species of *Burmannia* five are natives of Brazil, where they were found by Von Martius, who has not only accurately described them, but has given an able detail of the genus. The author, previous to his departure from Brazil, discovered five new plants, evidently allied to *Burmannia*, but which differ in many essential characters: from these he has established three new genera, *Dictyostega*, *Cymbocarpa*, and *Stemoptera*: they possess the habit of *Burmannia* in their thickened rhizoma with branching fibres, an erect stem, almost naked, or furnished with a few distant bractiform leaves and terminal flowers, with a tubular petaloid perianthium, having a six-partite border, composed of three sepals and three petals; stamens three, almost sessile, in the mouth of the tube below the petals; anthers with the cells disjoined and opening transversely; a simple style; three stigmata and a capsule surmounted by the withered perianth bursting irregularly; seeds minute, resembling those of *Orchideæ*; but the most important difference consists in their having unilocular capsules, with three parietal placentæ, while *Burmannia* has always a trilocular capsule, with central placentation, an essential difference, which entitles them to be considered, if not as forming a new natural order, at least as constituting a distinct sub-family. Allied to these are to be arranged three other plants, already recorded, the *Apteria setacea* of Nuttall, a native of North America, and *Gonyanthes candida* and *Gymnosiphon aphyllum* of Blume, by whom they were found in Java. The author considers his genus *Dictyostega* as coming very near *Apteria*, which, however, from the drawing and description of Mr. Nuttall, would seem to resemble *Stemoptera* still more closely in its habit, its seeds, and its large single flowers; but it does not appear to possess the very remarkable stamens of the latter genus, nor the habit or singular seeds of *Dictyostega*. He gives a full description of the characters of his new genera and species, adding at the same time the character of *Apteria* and of Dr. Blume's two genera, so as to collect

all the evidence yet known respecting the order of *Burmanniaceæ*. Of the genus *Dictyostega* he describes three species, which he found in Brazil, to which is to be added a fourth species, discovered by Mr. Schomburgk in British Guiana.

The following are their characters :—

DICTYOSTEGA.

Perianthium tubulosum, ovario adnatum, supernè liberum : *limbo* 6-fido, laciniis 3 alternis minoribus. *Stamina* 3 : *filamentis* brevissimis : *antheræ* *loculis* disjunctis, transversim dehiscentibus. *Stylus* simplex. *Stigmata* 3. *Capsula* 1-locularis, sub 3-valvis, polysperma, apice dehiscentis : *valvis* medio placentiferis. *Semina* minuta, scobiformia, testâ laxâ, reticulatâ, pertranslucidâ, nucleo quintuplò longiore vestita.

Plantæ (brasilienses) *rhizocarpeæ*, *radice* *fibrosâ*, *squamis* *membranaceis*, *imbricatis*, *ciliatis*, *incanis* *tectâ*. *Caulis* *erectus*, *subflexuosus*, *pallidè* *purpurascens*, *subsolitarius*, *rariùs* *ramiferus*, *et* *tunc* *ramis* 1—3 *erectis*, *alternis*, *trunco* *consimilibus*. *Folia* *bracteiformia*, *subsessilia*, *adpressa*. *Inflorescentia* *terminalis*, *dichotomè* *racemosa*, *vel* *subumbellato-cymosa*, *floribus* *purpurascentibus*, *pedicellatis*.

1. *D. orobanchioides*, caule erecto simplici vel ramifero, racemis geminis, floribus nutantibus unibracteatis, bracteis cum pedicellis alternantibus, capsulâ subvalvatâ ecostatâ longitudinalitèr dehiscente.—Monte Corcovado, Rio de Janeiro.
2. *D. umbellata*, caule erecto simplicissimo, foliis erecto-patulis, umbellâ simplici 6—9-florâ, floribus erectis, pedicellis basi bracteatis, ovario ecostato.—Serra dos Orgãos, Prov. Rio de Janeiro.
3. *D. costata*, caule erecto simplici, floribus erectis, cymâ bibracteâtâ, pedicellis ebracteatis, capsulâ evalvi 6-costatâ apice dehiscenti.—Rio de Janeiro.
4. *D. Schomburgkii*, caule erecto subsimplici, racemis geminis paucifloris, floribus unibracteatis, bracteis pedicello oppositis, perianthio medio haud constricto, laciniis obtusioribus, capsulâ 6-costatâ apice dehiscenti.—Guiana.

CYMBOCARPA.

Perianthium tubulosum, ovario adnatum, supernè liberum : *limbo* 6-fido, laciniis tribus alternis minoribus. *Stamina* omninò *Dictyostegæ*. *Stylus* simplex. *Stigmata* 3-loba, lobis gibboso-rotundatis, cornubus 2 subulatis erectis instructis. *Ovarium* gibboso-3-gonum, 1-loculare, placentis 3 parietalibus. *Capsula* 1-locularis, latere unico angulo superiore tantùm dehiscentis. *Semina* scobiformia, numerosissima, testâ reticulatâ nucleo vix excedente.

Plantæ (brasilienses) *rhizocarpeæ*, *radice* *fibrosâ*. *Caulis* *simplex*, *subflexuosus*, *erectus*, *albescens*. *Folia* *sessilia*, *bracteiformia*, *erecta*, *aut* *adpressa*. *Inflorescentia* *dichotomè* *spicata*, *pauciflora*, *floribus* *flavescenti-albidis*, *basi* *bracteatis*, *cum* *pedicellis* *brevissimis* *summo* *abruptè* *declinatis* *geniculatis*.

1. *Cymbocarpa refracta*.—Monte Corcovado, Rio de Janeiro.

STEMOPTERA.

Perianthium ovario adnatum, suprâ liberum, subinfundibuliforme : fauce turgidâ sacculis 3 interioribus auctâ : limbo 6-partito, laciniis acutis, æstivatione marginibus induplicatis, 3 alternis brevioribus. *Stamina* 3, fauci adnata : *filamentis* complanatis, è margine sacculorum orientibus bifurcatis, ramulo singulo antherifero alato. *Ovarium* turbinatum, 1-loculare, placentis 3 parietalibus. *Stylus* longitudine staminum. *Stigmata* 3, recurvata, apice glandulifera. *Capsula* 1-locularis, polysperma, subtrivalvis, apice 3-fisso dehiscens. *Placentæ* 3, parietales. *Semina* numerosissima, scobiformia, testâ nucleo vix excedente, reticulatâ, areolis elongatis oblique dispositis.

Plantæ (brasilienses) *rhizocarpeæ*, radice fibrosâ. *Caulis erectus, subdichotomè ramosus, ramis subflexuosis, pallidis, subpurpurascens*. *Folia pauca, sessilia, erecta, bracteiformia, pallida*. Inflorescentia terminalis, uniflora. Flores cæteris majores, ebracteati, purpurascens, Apteris Nutt. haud absimiles.

1. *Stemoptera lilacina*.—In uliginosis ad Serra dos Orgãos Prov. Rio de Janeiro.

All the species are described at length in the paper, and their characters are further illustrated by drawings, with details of the parts of fructification. The author remarks that upon the same principle that *Apostasiaceæ* have been separated from *Orchideæ*, and *Xyrideæ* from *Restiaceæ*, these plants ought to constitute an order distinct from *Burmanniaceæ*; but the difference between the unilocular capsule with parietal placentation and the trilocular capsule with axile placentation, which at first sight seems to offer a wide and well-founded distinction, appears of less value when we consider that the extensive order *Gentianeæ* presents similar differences, together with every possible gradation of transition from one extreme to the other. He therefore inclines to the view of preserving all within the natural order *Burmanniaceæ*, dividing it into two subfamilies, viz. 1. *Burmanniæ*, which will contain only the single genus *Burmannia* (and perhaps the *Gonyanthes* of Blume may be found to belong also to this section); 2. *Dictyostegeæ*, comprising *Dictyostega*, *Cymbocarpa*, *Stemoptera*, *Apteria*, *Gonyanthes*, and *Gymnosiphon*. He then proceeds to show the close affinity which *Burmanniaceæ* bear to *Orchideæ*, which often also present nearly a naked stem, with imperfectly developed leaves, and instances are moreover known in which they exhibit three distinct stamens and three stigmata: they have also an unilocular ovary, with parietal placentation; there exists also a close resemblance in the structure of the walls of the capsule, and there is hardly any difference in the

shape and structure of the seeds of *Dictyostega* and some species of *Pleurothallis*, which have both a transparent reticulated testa, showing distinctly the included nucleus suspended from the apex. The pollen of these plants also bears much resemblance to that of *Orchideæ*, in being inclosed in a peculiar anther-case, and consisting of coarse grains cohering in waxy masses. *Dictyostega orobanchioides* also offers a beautiful illustration of the emission of pollen tubes, which are seen penetrating the stigmata in crowded bundles of cottony filaments, each thread being clavately terminated by its respective grain of pollen.

There was also read a paper, entitled, "On the existence of Spiral Cells in the Seeds of *Acanthaceæ*." By Mr. Richard Kippist. Communicated by Prof. Don, Libr. L.S.

After briefly enumerating the other natural families in whose seeds spiral cells had been previously observed, the author proceeds to describe those of a plant brought from Upper Egypt by Mr. Holroyd (*Acanthodium spicatum*, Delile), whose peculiar appearance when placed under the microscope, first led him to examine those of other *Acanthaceæ*, in which family the existence of spiral cells had not before been noticed. The entire surface of the seed in *Acanthodium* is covered with whitish hairs, which are appressed, and adhere closely to it in the dry state, being apparently glued together at their extremities. On being placed in water, these hairs are set free, and spread out on all sides, they are then seen to be clusters of from five to twenty spiral cells, which adhere firmly together in their lower portions while their upper parts are free, separating from the cluster at different heights, and expanding in all directions like plumes, forming a very beautiful microscopic object. The free portions of the cells readily unroll, exhibiting the spire formed of one, two, or occasionally of three fibres, which may sometimes be seen to branch, and not unfrequently break up into rings. Throughout the whole length of the cell the coils are nearly contiguous; in the lower part they are united by connecting fibrils, and towards the base of the adherent portion become completely reticulated. The testa is a semitransparent membrane formed of nearly regular hexagonal cells, whose centre is occupied by an opaque mass of grumous matter. Those cells which surround the bases of the hairs are considerably elongated, and, gradually tapering into transparent tubes, appear to occupy the interior of the spiral clusters. Some of these appearances were noticed by Delile, who described the *Acanthodium* in the splendid work on Egypt, published by the French Institute, where also a slightly magnified figure of the seed will be found, but with-

out representing the spiral cells, which Delile does not appear to have detected.

Two species of *Blepharis* are mentioned as possessing a structure very similar to that of *Acanthodium spicatum*, differing chiefly in the smaller and more uniform diameter of the spiral cells, and in their thicker fibre, which is always single and loosely coiled.

The seed of *Ruellia formosa* on being placed in water develops from every part of its surface single short thick tapering tubes, within which in some case a spiral fibre is loosely coiled; whilst in others the place of the spiral fibre is supplied by distant rings.

In the seeds of *Ruellia littoralis*, *Phayloopsis glutinosa*, and *Barleria noctiflora*, the whole surface becomes covered with separate tubes, very similar in form, but destitute of spiral fibre, and terminating in a minute pore, from which streams of mucilage are discharged.

Those of several species of *Barleria*, *Lepidagathis*, &c. are entirely covered with long tapering simple hairs, which expand in water, and like the rest are enveloped in a thick coat of mucilage.

In all the foregoing species the hairs occupy the entire surface of the seed, and are usually directed towards its apex, though they occur often most abundantly at the edges; in others they are only found attached to a marginal ring of a different texture from the rest of the seed. This is the case in *Strobilanthes lupulina*. The seeds of many plants of this family are wholly destitute both of spiral cells or of any other appendages possessing hygroscopic properties, such for example as *Acanthus mollis* and *ilicifolius*, *Dipteracanthus erectus*, *Blechnum Brownii*, &c., *Ruellia secunda*, and several species of *Justicia* and *Eranthemum*.

TWEEDSIDE PHYSICAL AND ANTIQUARIAN SOCIETY.

A Quarterly Meeting of the Tweedside Physical and Antiquarian Society was held at the apartments of the Institution, Kelso, Feb. 17th, when Sir Thomas Makdougall Brisbane, Bart., the Society's President, occupied the chair. The attendance of Members was more than usually numerous. The donations which were announced as having been received by the Society, during the interval which had elapsed since the last Quarterly Meeting, were numerous, and many of them interesting and valuable.

Among those in the department of Botany and Zoology, were a collection of British insects, of the orders *Coleoptera* and *Lepidoptera*, amounting to several hundred species, systematically arranged, being the first instalment of a general collection, illustrative of the ento-

mology of Great Britain, from Prideaux John Selby, Esq. of Twizell.

From Mr. Plummer Johnston, Sprouston.—1st, specimen of Female Pintail Duck (*Anas acuta*) ; 2nd, Ditto, of Female Oyster-Catcher (*Hæmatopus Ostralegus*).

From Mr. John Rutherford, Kelso.—Specimen of Common Bunting (*Emberiza miliaria*).

From Mr. Wilkie of Ladythorne.—Twenty-two skins of foreign birds, of beautiful plumage.

From Mr. Murray, Corsbie.—White variety of Common Rook.

Other specimens of birds, &c. for preservation, were also received from Mr. Elliott Lockhart of Borthwickbrae, Mr. Wilkie of Ladythorne, Mr. D. M'Dougall, Cessford, &c. &c.

From Miss Makdougall, Makerstoun.—Specimens of a species of *Pinna* from Australia.

From Dr. William Scott, Milsington.—Various skins of birds, &c. from Hindostan.

The splendid contributions by Mr. Selby to the entomological collection of the Institution were also much admired, and warmly acknowledged by the Members present.

Dr. F. Douglas read to the Meeting a letter from Mr. Selby, containing the outline of a plan for sending abroad an experienced naturalist, with the view of making collections in the different departments of Natural History, to be afterwards transmitted to this country, and divided among a certain number of subscribers, who are to bear the expenses of the expedition ; and requesting the Society to join as one of the partners in the undertaking. The Meeting felt compelled to decline this proposal, on the plea of its being attended with an expense too heavy for the present state of the Society's funds, which, besides, they considered as properly devoted to objects of a local nature merely ; upon which, Sir Thomas Brisbane, with that zeal for science by which he has always been characterized, declared his wish to become a subscriber to the scheme in behalf of the Society, to the Museum of which he would cause to be handed over such objects as might be obtained. The Meeting acknowledged, in the warmest manner, this new proof of the liberality of their President ; and Dr. F. Douglas was desired to communicate with Mr. Selby on the subject.

ORKNEY NATURAL HISTORY SOCIETY.

From accidental causes we have only just received the first Annual Report of this Society (instituted on the 28th of Dec. 1837),
Ann. Nat. Hist. Vol. 5. No. 29. April 1840. L

which we consider as of great interest, both as showing that the inhabitants of that far distant part of the United Kingdom are determined not to be behind their more favoured countrymen of the south; and also as being the first instance that has come under our notice of a Society for the pursuit of science being so constituted as to admit to membership individuals belonging to the poorer classes of society. It will be seen by the laws of the Society, extracts from which we subjoin, that the annual subscription is fixed at the very small sum of *two shillings*, and yet the committee are able to state, at the end of the first year of the Society's existence, that "the funds, so far from being embarrassed, have more than met the numerous outlays."

Amongst the laws of the Society are the following :

"1. The Society shall be designated '*The Orkney Natural History Society*,' and shall have for its object the promoting of natural science by the support of a museum, and by any other means in its power.

"2. The property of the Society shall be inalienable.

"3. The ordinary Members of the Society shall pay the sum of two shillings sterling annually.

"4. The general meetings of the Society shall be held quarterly, viz. on the third Tuesday in January, April, July, and October, the chair to be taken at 1 o'clock, P.M.; and that of January to be the anniversary, when the office-bearers shall be elected.

"7. Gentlemen friendly to the institution may be elected Corresponding Members, and such as are eminent for science may be elected Honorary Members of the Society."

The objects that they have in view are stated in the first sentence of the report in the following terms:—"The Orkney Natural History Society was instituted for the twofold object of investigating the Natural History and Antiquities of the county, and of stimulating the inhabitants of these islands to the study of the Almighty's works;" and the progress which they have made in one year is stated as follows:—In geology there are now in the museum above 500 specimens from Upper Canada, Norway, France, Italy, and the British Isles. The Orkney specimens include about 100 fossil fish. The specimens in mineralogy amount to 400. There are about 60 specimens of birds and 200 eggs. The collection of land plants already consists of upwards of 600 specimens, and the collection of Algæ, for obtaining which there is not a better place in Britain than these islands, is "truly excellent." The Society possesses several most ardent cultivators of marine botany, amongst whom may

be mentioned the Rev. Charles Clouston, Dr. Pollexfen, Miss Watt of Skail, and Mrs. Traill of Woodwick. It is interesting to find, that the study of the Algæ, which has been so highly honoured by numbering among its most successful cultivators a Mrs. Griffiths and a Miss Hill, still continues to be a favourite pursuit with our fair countrywomen.

The Museum also contains about 100 species of shells, and numerous antiquarian and miscellaneous objects of interest. The number of ordinary members in January 1839 was 118.

We trust that such an instance of what may be done by enlisting the poorer classes of society in the support of institutions of this character will not be without its use, but that the inhabitants of the towns of England will do for their poorer neighbours that which has been already done with such distinguished success by the clergy and other influential persons in the distant and stormy Orkades.

We may add that the address of the Secretary of the Society is the Rev. W. Stobbs, Stromness, Orkney.

MICROSCOPICAL SOCIETY OF LONDON.

March 18, 1840.—Mr. Owen in the Chair.

A paper was read by Mr. Edwards “On the Structure and Affinities of the *Bacillariæ* of Ehrenberg.” After commenting on the Polygastric characters of these animalcules, the indestructible nature of their siliceous coverings, and their mode of reproduction by spontaneous division, the author proceeded to discuss the merits of those views, which have claimed for the *Bacillariæ*, on the one hand a place in the vegetable, and on the other a position in the animal kingdom. The mixed nature of the phænomena exhibited by these animalcules, which has also led some naturalists to consider them as in one stage of their existence animals, and in another vegetables, furnish, according to the author, sufficient grounds for considering the *Bacillariæ* as an osculant group, uniting the two great kingdoms of nature. An interesting discussion followed on this subject, in which Dr. Lindley, Messrs. Quekett, Varley, the President, and other Members took a part.

ZOOLOGICAL SOCIETY.

October 8, 1839.—The Rev. F. W. Hope in the Chair.

The following letter, addressed to the Chairman of the Scientific Committee by John Gould, Esq., Corresponding Member, was read; it is dated Van Diemen's Land, May 10th, 1839:—

“Although my present occupations will not permit me to send a

lengthened communication, still, as a Corresponding Member of the Zoological Society, I am desirous of contributing to the pages of its proceedings; I therefore forward herewith the characters of some new species of birds, together with a very slight summary of my peregrinations since leaving England, trusting to lay before you at some future period a more full account of the results of my labours. The greater number of the birds from which the following characters are taken are from the collection made by the officers of Her Majesty's ship the *Beagle*. To Captain Wickham and the other officers of that vessel I am indebted for much kindness and attention. By the exertions of Mr. Bynoe, surgeon of the *Beagle*, science has been enriched, not only by the discovery of these new species of birds, but of several others, and some quadrupeds of a most interesting description, the whole of which have been placed in my hands for the purpose of describing, figuring, &c.

"It is now twelve months since I left England. The early part of the passage was boisterous and adverse, our ship being detained eleven days in the Bay of Biscay, during which period numbers of land-birds, all of European species, constantly visited the vessel; but as no great interest attaches itself to their chance occurrence, I shall confine my observations more particularly to those species that make the expansive ocean their home, and whose natural limits have been but slightly recorded. The members of the genus *Thalassidroma* were the birds to which my especial attention was directed, from the circumstance of the group being but slightly understood, and from the great interest these little tenants of the ocean excite in the mind of the voyager. Immediately off the Land's End, Wilson's Storm-Petrel (*Thalassidroma Wilsoni*) was seen in abundance, and continued to accompany the ship throughout the Bay. The little Storm-Petrel (*Thalassidroma pelagica*, Selby) was also seen, but in far less numbers: both species disappeared on approaching the latitude of Madeira, their place there being occupied by another species, which I took to be *Thal. Bulveri*. This latitude was also favourable to the Shearwaters, *Puffinus cinereus*, and *Puff. obscurus*, the former being there in great numbers.

"We came to anchor in the roadstead of Santa Cruz, Island of Teneriffe, on the 11th of June. During our short stay at this island, I proceeded as far into the interior as circumstances would permit, and spent a part of two days most delightfully. Among the birds I observed during my rambles were the Common Blackbird (*Merula vulgaris*, Ray), the Robin (*Erythaca rubecula*, Swains.), and the Black-cap Warbler (*Curruca atricapilla*, Bechst.),—a more southern

locality, I believe, than has been hitherto recorded against these species. The fishes of this island also claimed a portion of my attention, several species of which I procured and preserved.

"We crossed the equator on the 7th of July, having been more than twenty days within the tropics, part of which time our vessel lay becalmed. This portion of the ocean's surface was also inhabited by Storm-Petrels, but of a distinct species from any I had hitherto observed, and which I believe to be new to science. These birds, with now and then a solitary *Rhynchops* and Frigate Bird (*Tachypetes*), were all of the feathered race that I observed in these heated latitudes, a part of the voyage which always hangs heavily upon those destined to visit these distant regions; by me, however, it was not so much felt, the monotony being relieved by the occasional occurrence of a whale, whose huge body rolled lazily by; by a shoal of porpoises, who sometimes perform most amusing evolutions, throwing themselves completely out of the water, or gliding through it with astonishing velocity; or by the occasional flight of the beautiful Flying Fish, when endeavouring to escape from the impetuous rush of the Bonito or Albacore.

"On the 20th of July we reached the 26th degree of south latitude, and were visited for the first time by the Cape-Petrel (*Procellaria Capensis* of authors). On the 23rd, lat. $31^{\circ} 10'$ S., long. 24° W., we found ourselves in seas literally teeming with the feathered race. Independently of an abundance of Cape-Petrels, two other species and three kinds of Albatrosses were observed around us. The latter were *Diomedea exulans*, *D. chlororhyncha*, and *D. fuliginosa*. A few days after this we commenced running down our longitude, and from this time until we reached the shores of Van Diemen's Land, several species of this family (*Procellariidæ*) were daily in company with the ship. Whenever a favourable opportunity offered, Captain McKellar obligingly allowed me the use of a boat, and by this means enabled me to collect nearly all the species of this interesting family that we fell in with.

"As I had every reason to expect, I found the Australian seas inhabited by their own peculiar Storm-Petrels (*Thalassidroma*), four distinct species of which I have already observed since leaving the Cape.

"From the westerly winds which prevail in the southern hemisphere, between the latitudes 35° and 55° , I am induced to believe that a perpetual migration is carried on by several of the members of this oceanic family continually passing from west to east, and circumnavigating this portion of the globe. This remark more par-

ticularly refers to the Albatrosses, Prions, and other large kinds of Petrels; the same individuals of several of these species having been observed to follow our ship for some thousands of miles. Until I had ascertained that they were nocturnal, it was a matter of surprise to me how the birds which were seen around the vessel at nightfall were to be observed crossing our wake at daybreak on the following morning, the ship having frequently run a distance of nearly 100 miles during the night.

“In conclusion, I may observe, that whatever success I have met with on the ocean, or whatever pleasures I may have enjoyed during the voyage, the country to which we were safely conveyed by our frail bark (now lying a wreck on the Trowbridge Shoal, Spencer’s Gulf) has still greater treasures.

“During the eight months spent in these regions, six have been devoted to Van Diemen’s Land and the islands in Bass’s Straits, where I have made extensive and most interesting collections. Independently of the skins of birds and quadrupeds, skeletons of all the forms, together with entire bodies for dissection, have been procured, as also the nests and eggs of nearly seventy species of birds from Van Diemen’s Land alone. The short visit I have paid to the continent of Australia has convinced me that much of interest there remains buried in obscurity, and that I shall there find much to occupy my attention when I fairly commence my researches in that country. The drought this season has been most distressing to the colonists. The Liverpool range was the furthest journey I made into the interior. While there I procured several specimens of the *Menura superba*; three of these I have entire for Mr. Owen to dissect; I have also the skeletons of two others, besides skins, &c. The only remark I shall now offer respecting this truly interesting bird is, that it has no relationship whatever to the *Gallinaceæ*, as has hitherto been considered.

“My assistant is now at Swan River, and I start for South Australia tomorrow; after which I proceed to Sydney; thence into the interior*. I intend going to Moreton Bay and New Zealand before my return, and if I can accomplish it, to Port Essington and other parts of the north.

“I am happy to add, that in the execution of my researches the governors of the different colonies lend me their aid most willingly; and I shall ever be proud to acknowledge the unremitting kindness of Sir John Franklin, whose goodness of heart is only equalled by his zealous attention to the duties of his high official station.”

* See Letter dated September 1839, p. 116 of our present Number.

Mr. Gould's descriptions of the new Australian birds referred to in the letter were next read.

CYPSELUS AUSTRALIS. *Cyp. gutture et uropygio albis; corpore supernè et subtùs intensè fusco; dorso metallicè splendente; plumis pectoris abdominisque albo marginatis; alis caudæque nigrescentibus; rostro, oculis, et pedibus nigris.*

Long. tot. $6\frac{1}{2}$ poll.; rostri, $\frac{3}{4}$; alæ, $7\frac{1}{4}$; caudæ, $3\frac{1}{2}$; tarsi, $\frac{7}{16}$.

This species is about the size of *Cypselus murarius*: I first met with it on the 8th of March, 1839. They were in considerable abundance, but flying very high. I succeeded in killing one, which was immediately pronounced by Mr. Coxen and others to be new to the colony. On the 22nd I again saw a number of these birds hawking over a piece of cleared land at Yarrondi, on the Upper Hunter: upon this occasion I obtained six specimens, but have not met with it since.

PODARGUS PHALÆNOÏDES. *Pod. cinereo, fuscoque ornatus, lined nigrâ centrali per plumas singulas excurrente; scapularibus, tectricibusque majoribus castaneo sparsis; primariis fuscis, albo angustè fasciatis; caudâ cuneiformi, nigro angustè fasciatâ; rostro fuscescenti-corneo; pedibus olivaceis.*

Long. tot. $14\frac{3}{4}$ poll.; rostri, $2\frac{1}{4}$; alæ, $8\frac{1}{2}$; caudæ, $6\frac{1}{2}$; tarsi, 1.

Hab. The north-west coast of Australia.

This bird is smaller than any other species of the genus yet discovered in Australia.

From Benjamin Bynoe, Esq.

GRAUCALUS PHASIANELLUS. *Grauc. cinereus; uropygio abdomineque albis, angustè nigro-fasciatis; crisso albo; alis caudæque nigris, hâc ad basin albâ; rostro tarsisque nigris.*

Long. tot. 15 poll.; rostri, $1\frac{1}{4}$; alæ, $8\frac{1}{2}$; caudæ, 8; tarsi, $1\frac{5}{8}$.

Hab. Liverpool Plains.

From the collection of Stephen Coxen, Esq.

PACHYCEPHALA LANIOÏDES. *Pach. vertice, plumis auricularibus et pectore nigris; dorso posteriore fasciâ castaneâ ornato; gutture, abdomine medio, crissoque albis; dorso, lateribus, humeris, necnon primariis secundariis tectricibusque, externè, cinereis; caudâ, rostro, pedibusque nigris.*

Long. tot. $7\frac{1}{2}$ poll.; rostri, 1; alæ, $3\frac{3}{4}$; caudæ, $3\frac{1}{4}$; tarsi, 1.

Hab. The north-west coast of Australia.

From Benjamin Bynoe, Esq.

PETROICA ROSEA. *Pet. (mas) vertice, gulâ, corporeque supernè cinereis; fronte fasciâ angustâ albâ notatâ; pectore rosaceo; abdomine, crissoque, albis; alis, rectricibusque caudæ sex intermediis nigrescentibus; rectricibus externis ad apicem albis; rostro pedibusque nigrescentibus.*

Fœm., fasciâ frontali luteâ; corpore suprâ cinereo-fusco; alis, fasciis, secundariis fasciis duabus luteis, obscurè notatis; caudâ fuscâ.

Long. tot. $4\frac{1}{2}$; rostri, $\frac{1}{2}$; alæ, $2\frac{3}{4}$; caudæ, $2\frac{1}{4}$; tarsi, $\frac{1}{2}$.

Hab. Hunter, and the Liverpool Range.

This species is nearly allied to *Petroica Lathamii*. It inhabits thick brushes. I killed specimens both on the Hunter River and the Liverpool Range.

PETROICA PULCHELLA. *Pet. nigra, fronte notâque humerali albis; pectore abdomineque coccineis; rostro nigro; pedibus fuscis.*
Long. tot. 5 poll.; rostri, $\frac{3}{4}$; alæ, $\frac{3}{4}$; caudæ, $2\frac{1}{8}$; tarsi, 1.

Hab. Norfolk Island.

MALURUS CRUENTATUS. *Mal. (mas) dorso, humerisque coccineis; partibus reliquis nigris.*

Fœm., pallidè fusca, abdomine albescente; rostro, tarsisque pallidè fuscis.

Long. tot. 4 poll.; rostri, $\frac{1}{2}$; alæ, $1\frac{5}{8}$; caudæ, $1\frac{3}{4}$; tarsi, $\frac{3}{4}$.

Hab. North-west coast of Australia.

PARDALOTUS UROPYGIALIS. *Pard. vertice et lined oculari nigris; lined superciliari, pectore, et abdomine medio, albis; gulâ, genisque croceis; uropygio sulphureo; dorso cinerescenti-olivaceo; alis nigris, primariis plurimis ad basin albo notatis; alâ suprâ ad apicem coccineâ; caudâ nigrâ, plumis externis tribus ad apicem albis; rostro nigro; tarsi plumbeis.*

Long. tot. $3\frac{1}{2}$ poll.; rostri, $\frac{1}{2}$; alæ, $2\frac{1}{4}$; caudæ, 1; tarsi, $\frac{3}{4}$.

Hab. North-west coast of Australia.

From Benjamin Bynoe, Esq.

AMADINA ANNULOSA. *Am. facie gulâque albis, vittâ nigrâ marginatis; pectore albescente, subtus fasciâ nigrâ marginato; vertice dorsoque cinerescenti-fuscis, lineis albidis transversis, angustè notatis; uropygio, crisso, caudâque nigris; alis fuscis; tectricibus, secundariisque cinereo crebrè ornatis; rostro pedibusque plumbeis.*

Long. tot. 4 poll.; rostri, $\frac{3}{8}$; alæ, 2; caudæ, $2\frac{1}{8}$; tarsi, $\frac{1}{2}$.

Hab. North-west coast of Australia.

This species is nearly allied to *Estrilda Bichenovii*.

From Benjamin Bynoe, Esq.

AMADINA ACUTICAUDA. *Am. vertice genisque cinereis; corpore cervino; abdomine roseo lavato; loris, gulâ, fasciâ per uropygium currente, caudâque, nigris; tectricibus caudæ, crisso, et femoribus, albis; rostro pedibusque flavis.*

Long. tot. $5\frac{3}{4}$ poll.; rostri, $\frac{3}{8}$; alæ, $2\frac{3}{8}$; caudæ, $3\frac{3}{4}$; tarsi, $\frac{5}{8}$.

Hab. North-west coast of Australia.

This species has the two central tail-feathers very long and tapering.

From Benjamin Bynoe, Esq.

DASYORNIS STRIATUS. *Das. fuscus; abdomine cinerescente; plumis dorsalibus lined centrali albâ notatis; rostro pedibusque nigrescentibus.*

Long. tot. $6\frac{1}{2}$ poll.; rostri, $\frac{5}{8}$; alæ, $2\frac{3}{8}$; caudæ, $3\frac{1}{2}$; tarsi, 1.

Hab. Liverpool Plains, New South Wales.

This species is nearly allied to the *Amytis textilis* of Lesson.

MYZANTHA FLAVIGULA. *Myz. spatio pone oculos, fronte, gulâque flavis; uropygio albo; dorso cinereo, obscure albo fasciato;*

loris, plumisque auricularibus, nigris; gulâ, genis, corporeque subtus, albis, pectore notis fuscis in formâ sagittæ ornato; alis caudâque fuscis; primariis externè, caudâque ad basin flavescens; caudâ ad apicem albâ; rostro flavo; pedibus flavescens-fuscis.

Long. tot. $9\frac{3}{4}$ poll.; rostri, 1; alæ, $5\frac{1}{4}$; caudæ, 5; tarsi, $1\frac{5}{8}$.

Hab. Banks of the Namoi, interior of New South Wales.

This species is rather larger than *Myzantha garrula*, to which, and *M. citreola*, it is closely allied.

MYZANTHA LUTEA. *M. cute nudâ pone oculos, fronte, apicibusque plumarum ad latera colli, citreis; loris nigro-fuscis; plumis auricularibus nigrescentibus splendore argenteis; corpore suprâ cinereo, nuchâ dorsoque albo transversim fasciatis; uropygio, tectricibus caudæ, et corpore subtus, albis; gulâ, pectoreque cinereo lavatis, plumis singulis notâ fuscâ fasciatis; alis fuscis plumis obscurè citreo marginatis; caudâ fuscâ ad apicem albâ; rostro citreo; pedibus flavescens-fuscis.*

Long. tot. $10\frac{3}{4}$ poll.; alæ, $5\frac{1}{8}$; caudæ, $5\frac{1}{4}$; tarsi, $1\frac{1}{4}$.

Hab. North-west coast of Australia.

From Benjamin Bynoe, Esq.

TROPIDORHYNCHUS ARGENTICEPS. *Trop. vertice argenteo, capitibus partibus reliquis nudis, et nigrescentibus; corpore subtus albo; pectoris plumis lanceolatis; corpore suprâ caudâque fuscis; rostro pedibusque nigrescenti-fuscis.*

Long. tot. $10\frac{1}{2}$ poll.; rostri, $1\frac{3}{8}$; alæ, $5\frac{1}{2}$; caudæ, $4\frac{1}{2}$; tarsi, $1\frac{1}{8}$.

Hab. North-west coast of Australia.

From Benjamin Bynoe, Esq.

POMATORHINUS RUBECULUS. *Pom. gulâ, strigâque superciliari albis; pectore, et abdomine superiore rufescens-fuscis; strigâ a rostro, per oculos, ad occiput tendente nigrescenti-fuscâ; vertice, dorso, abdomineque imo intensè fuscis, olivaceo-tinctis; tectricibus caudæ, crisso caudâque nigris, hac ad apicem albâ, rostro corneo; pedibus nigrescentibus.*

Long. tot. $9\frac{1}{4}$ poll.; rostri, $1\frac{1}{8}$; alæ, 4; caudæ, $4\frac{3}{8}$; tarsi, $1\frac{1}{4}$.

Hab. North-west coast of Australia.

From Benjamin Bynoe, Esq.

PTILOTIS FLAVESCENS. *Pt. olivaceo-cinerea, capite corporeque subtus citreis; notâ ad latera capitis fuscâ, et pone hanc alterâ nitidè flavâ.*

Long. tot. $4\frac{1}{2}$ poll.; rostri, $\frac{3}{4}$; alæ, $2\frac{1}{8}$; caudæ, $2\frac{1}{2}$; tarsi, $\frac{3}{4}$.

Hab. North-west coast of Australia.

From Benjamin Bynoe, Esq.

MYZOMELA ERYTHROCEPHALA. *Myz. intensè fusca, capite, et uropygio, coccineis; rostro pedibusque nigris.*

Long. tot. $4\frac{1}{2}$ poll.; rostri, $\frac{3}{4}$; alæ, $2\frac{1}{4}$; caudæ, $1\frac{3}{4}$; tarsi, $\frac{5}{8}$.

Hab. North-west coast of Australia.

From Benjamin Bynoe, Esq.

SITTELLA LEUCOPTERA. *Sitt. vertice, plumis auricularibus, necnon alis, caudâque nigris, hac ad apicem albâ, illis fasciâ trans-*

versâ alba ornatis; gulâ, tectricibus caudæ, corporeque subtus albis; dorso, cinerescenti-fusco, plumis ad medium fusco notatis; rostro ad basin pallidè flavo, ad apicem nigro, pedibus flavis.

Long. tot. 4 poll.; rostri, $\frac{1}{6}$; alæ, 3; caudæ, $1\frac{1}{2}$; tarsi, $\frac{1}{6}$.

Hab. North-west coast of Australia.

From Benjamin Bynoe, Esq.

HEMIPODIUS CASTANOTUS. *Hem. capite, et pectore olivaceo-cinereis, plumis colore cervino notatis, illius ad apicem, hujus apud medium; abdomine medio crissoque stramineis; strigâ superciliari, caudâ, dorso et humeris, castaneis, dorsi, humerorumque plumis albo guttatis, singulis guttis anticè nigro marginatis; primariis fuscis, cervino colore marginatis; rostro pedibusque pallidè flavis.*

Long. tot. 7 poll.; rostri, $\frac{7}{8}$; alæ, $3\frac{1}{2}$; tarsi, 1.

Hab. North-west coast of Australia.

From Benjamin Bynoe, Esq.

Mr. Yarrell exhibited a small but perfect specimen of the Eagle Ray, *Myliobatis aquila* of British fishes, which had been found on the shore of Berwick Bay, and was sent to him from thence by Dr. George Johnston.

"Particular interest attaches to this very rare specimen," observed Mr. Yarrell, "since it establishes the fact that this fish is a native species; the only evidence which previously existed of the Eagle Ray being a British fish was founded on some parts of a specimen, believed to belong to this species, which were procured from a fisherman of Scarborough by Mr. Travis, a surgeon in that place."

A fresh specimen of the Angler-fish (*Lophius piscatorius*), presented by John Goldham, Esq., was also exhibited.

MISCELLANEOUS.

HIRUNDO PURPUREA, PURPLE MARTIN OF AMERICA, SHOT IN BRITAIN.

In the seventeenth Number of Mr. Yarrell's British Birds, that ornithologist quotes a letter from Mr. Frederic McCoy of Dublin to the following effect: "I beg to send you a notice of a bird new to the European Fauna which has lately occurred on our coast. It is the *Hirundo purpurea*, the Purple Martin of American ornithologists. The specimen was a female, corresponding accurately with the description of Wilson. It was shot near Kingston, county of Dublin, and sent for dissection to my friend Dr. Scauler a few hours afterwards. As it agrees perfectly with the description of authors, it will be unnecessary to describe the specimen, which is now preserved in the Museum of the Royal Dublin Society."—*Yarrell's B. Birds*, ii. p. 275.

NOTICE RESPECTING *AMPHIPEPLEA GLUTINOSA*.

M. Troschel lately read an account before the Society Der Naturforschender Freunde in Berlin, of the examination in which he had been engaged of *Amphipeplea glutinosa*, Nilss. (*Limnæus** *glutinosus*, Drap.) recently found in the neighbourhood of Berlin. He had accurately examined the tongue and other mouth-parts, and found that from these, as well as from the structure of the mantle and nervous system recently described by M. Vanbeneben, it deserves to form a distinct genus, and to be separated from *Limnæus* and *Physa*. *Amphipeplea* agrees with the former genus in the structure of the antennæ, of the foot, and in the position of the respiratory, anal, and sexual aperture on the right side; with the latter, in the absence of lateral maxillæ, and also from the tongue being provided with serrated teeth. There is therefore between the genera *Physa* and *Limnæus* a twofold transition,—one through the genus *Planorbis*, the second through *Amphipeplea*. I propose therefore the following schema for the family of the water Pulmonata.

- I. An upper maxilla, serrated teeth on the tongue, the mantle generally folding over the shell. Animal active, lively.
 1. Antennæ filiform; foot posteriorly acuminate; respiratory, anal, and sexual aperture on the left side. PHYSA.
 2. Antennæ triangular; foot posteriorly rounded; respiratory, anal, and sexual aperture on the right side. AMPHIPEPLEA.
- II. An upper and two side maxillæ, simple conical teeth on the tongue, mantle not folding over the shell. Animal inactive.
 3. Antennæ filiform; foot posteriorly acuminate; respiratory, anal, and sexual apertures on the left side. PLANORBIS.
 4. Antennæ triangular; foot posteriorly rounded; respiratory, anal, and sexual apertures on the right side. LIMNÆUS.

ON *PINUS PUMILIO*, HK. BY PROFESSOR GOEPPERT.

There are still botanists who regard the Dwarf Pine as a mere form of *Pinus sylvestris* produced by the elevated habitat. The present notice of an experiment made with seed will perhaps not be without interest, and tend to refute this, in my opinion, erroneous view.

In 1828 M. Beinert of Charlottenbrunn in Silesia procured some ripe cones of *P. Pumilio* from the Riesengebirge, together with some

* A multitude of needless synonyms burthen the descriptions of this genus, because conchologists cannot agree as to its orthography:—*Limnæus*, *Lymnæus*, *Lymneus*, &c. We believe the classical authority of Dr. Goodall, whose loss we have to deplore, was decidedly in favour of *Limneus*.—ED.

of *P. sylvestris*, and planted them on the northern pent of the Lorbeerberg, near Charlottenbrunn, 1800 feet above the level of the sea. In the second year the plants made their appearance, of which, however, only one specimen of *P. Pumilio* succeeded. On the 9th of Sept. 1839, I visited this spot and found the plants in the following condition. The specimen of *P. Pumilio* is at its base one inch in diameter, bends down immediately at its exit from the soil with deflected convexity, and divides at a distance of two inches into two main branches, of which one is 12, the other 9 inches long. Each of these branches again divides 1 inch from their origin into 5 or 6 diverging branches of from 5 to 6 inches in length, which all lie extended on the earth. The numerous leaves are stiff, fasciculate, compressed, curvate, and shortened, just like those occurring on the highest elevations of the Riesengebirge. As yet no flowers have made their appearance. Now while this plant creeps on the soil, the neighbouring specimens of *P. sylvestris* which germinated at the same time have attained a perpendicular height of 10 to 13 feet, with a diameter of from $2\frac{1}{2}$ to $3\frac{1}{2}$ feet.—*Linnaea*, Part V. vol. xiii. 1839.

ON THE NESTS OF THE FIFTEEN-SPINED STICKLEBACK, OR *GASTER-OSTEUS SPINACHIA* OF LINNÆUS.

These nests are to be found in spring and summer on several parts of our coast, in rocky and weedy pools between tide marks. They occur occasionally near Berwick, but seem to be more common near Eyemouth and Coldingham. They are about eight inches in length, and of an elliptical form or pear-shaped, formed by matting together the branches of some common *Fucus*, as, for example, of the *Fucus nodosus*, with various confervæ, ulvæ, the smaller florideæ, and coralines. These are all tied together in one confused compact mass by means of a thread run through, and around, and amongst them in every conceivable direction. The thread is of great length, as fine as ordinary silk, tough and somewhat elastic; whitish, and formed of some albuminous secretion. The eggs are laid in the middle of this nest in several irregular masses of about an inch in diameter, each consisting of many hundred ova, which are of the size of ordinary shot, and of a whitish or amber colour according to their degree of maturity. The further advanced are marked with two round black spots, which are discovered by the microscope to be the eyes of the embryo, at this period disproportionally large and developed. Masses of eggs, in different stages of their evolution, are met with in the same nest. It is evident that the fish must first deposit its spawn amid the growing fucus, and afterwards gather its branches

together around the eggs, weaving and incorporating at the same time all the rubbish that is lying or floating around the nucleus.

For the safety of its nest and spawn, the fish is apparently very anxious for a time. Some individuals were watched, by Mr. Duncan and the Rev. Mr. Turnbull, for some weeks, and it was observed that the same fish was always in attendance upon its own nest. During the time of hope and expectation, they become fearless, and will allow themselves to be taken up by the hand repeatedly. There can be no doubt that their object in remaining near the nest is to guard it against the attacks of such animals as might feel inclined to prey upon its contents.

NOTE.—Since the preceding notice was read to the Club, the second volume of Mr. Swainson's 'Natural History of Fishes,' &c. has been published; and I find that in it these nests are said to be constructed by the *Gobies*, on the authority of Olivi. The question is worth further inquiry; but on mentioning this statement of Olivi's to Mr. Maclaren of Coldingham, he assured me that he had seen and watched the stickleback in the act of making the nests we have just described. G. J.—*From the Transactions of the Berwickshire Naturalists' Club.*

ON *VESPERTILIO ÆDILIS*, JENYNS.

In Wiegmann's Archiv, Part I. for 1840, we find, in a valuable paper by MM. Keyserling and Blasius "On the generic and specific character of the European Bats," the following notice on the above animal lately described by Mr. Jenyns as probably forming a new species:

"*Vespertilio ædilis*, Jenyns (Annals of Nat. Hist. No. XV. p. 73, Plate XIII.), is brought forward as a new species, and carefully described by Mr. Jenyns from a white-coloured stuffed specimen; it is compared with *V. Daubentonii*, from which it is said to be distinguished:

"1. *by its more acute snout.*—In dried specimens the snout is generally more acute than in fresh ones, and this affords therefore no ground for comparison.

"2. *by the form of the tragus.*—The incision at the apex is probably accidental and individual; we have found such incisions even to vary on both ears of one and the same individual. The tooth at the base exists in all, although in most cases overlooked, and affords no distinction.

"3. *by the hairy covering of the interfemoral membrane.*—The granules mentioned by Jenyns, upon which the hairs originate, are also to be seen on fresh, and less distinctly on dried, specimens of *V. Daubentonii*.

"The admeasurements agree very closely with *V. Daubentonii*, to which we believe it must in every respect be referred."

A NEW MARSUPIAL ANIMAL.

Perameles Tuckeri, n. s. Head short, conical; ears large, hairy, coloured like the back, with a blackish edge; fur soft, brown, varied with gray hairs, and black tips; sides yellow-brown, beneath yellowish gray, under fur of back lead-coloured; tail as long as the body, tapering, hairy, and coloured like the body at the base, blackish and with rather adpressed hairs for two-thirds of its length. Length of the head $2\frac{1}{4}$, of the body $5\frac{3}{4}$, of tail $5\frac{3}{4}$, of hind foot $2\frac{1}{4}$ inches.

Inhab. Australia. In the collection of Mr. Tucker, the naturalist dealer, after whom I have named it.—JOHN E. GRAY.

A NEW SPECIES OF FOSSIL DOLPHIN.

M. Von Olfers laid before the meeting of the Royal Academy of Sciences of Berlin (Dec. 19, 1839), the fragments of some fossil remains of *Cetaceæ* found in the Prussian states. The most important are the clearly distinguishable remains of the skull of a Dolphin (*Delphis Karstenii*) converted into sandstone, which differs from all hitherto found, and appears to form the transition between *D. globiceps* and the allied species and the fossil genus *Ziphius*. It occurred near Bünde in Westphalia. Vertebrae of *Balanoptera* were also communicated by Prof. Becks; they occurred in a clay bed [Thonlager] between Bocholt and Oeding.

ON THE MINERAL CALLED *DYSODIL* AS A PRODUCT FROM THE SHELLS OF INFUSORIA. BY C. G. EHRENBURG.

In 1808 M. Cordier in Paris gave this substance the name of Dysodil, as a peculiar species of mineral; it had, however, previously been placed by mineralogists amongst the bituminous substances, and called *foliated mineral pitch* (*blättriges Erdpech*). As is well known, it is combustible, and in Sicily, where it was first discovered, it is used as peat.

As early as the 16th of April of this year, I made a communication to the Society of the Friends of Natural History in Berlin (see the *Staatszeitung* of the 29th of April), in which I stated that this mineral occurring in Sicily, resembling yellow wax, and composed of densely matted together siliceous shells (*Kieselschalen*) of the *Naviculæ* penetrated and cemented by a kind of resin, consists of a species of mail-covered infusoria. I also stated that there existed in the collections of the mineral-dealer, M. Krantz of Berlin, a lignite from Westerwalde, the colour of which is quite black, and in which may be recognised all the microscopic characters of the yellow

dysodil of Sicily, but which is distinguished by its containing a considerable quantity of pine-tree pollen, and other vegetable remains.

Since that time it has been found in two other places. The foliated serviceable bituminous coal from Geistinger Busch near Rott and Siegburg, to the north of the Siebengebirge, is, although as black as old leather, quite similar to the dysodil, only it is richer in vegetable remains.

In a fourth similar foliated lignite from Vogelsberge, given me to examine, as were the former, by Ober-Bergrath von Dechen, there may be recognised very beautifully preserved infusorial shells. This substance is also like the black dry sole of a shoe. From these inquiries we see that the species of mineral called dysodil belongs to the infusorial conglomerates, and is evidently a *Polirschiefer* or *Blättertripel* accidentally penetrated by mineral pitch; whilst at Bilin, Cassel, etc., it appears without any mixture of bitumen. Its colour may be yellow or even brown and black. It nowhere forms exceedingly large, but sometimes rather extensive and useful beds.—*Poggendorff's Annalen*.

METEOROLOGICAL OBSERVATIONS FOR FEB., 1840.

Chiswick.—Feb. 1. Cloudy: rain. 2. Very fine. 3. Rain. 4. Boisterous with rain. 5. Rain: clear. 6. Rain: cloudy. 7. Rain. 8. Heavy showers. 9. Fine. 10. Heavy showers: clear and very fine at night. 11. Fine. 12. Rain. 13. Very fine. 14. Foggy. 15. Frosty: rain. 16. Hazy and mild. 17. Dense fog. 18. Dry cold haze. 19. Clear and cold. 20. Cloudy, with some snow-flakes falling. 21. Bleak and cold. 22. Overcast. 23. Cold and dry. 24. Fine but cold. 25. Frosty haze. 26. Cold haze. 27. Cloudy, cold and dry. 28, 29. Fine but cold.

Boston.—Feb. 1. Cloudy: rain P.M. 2. Fine: rain early A.M. 3. Stormy: rain early A.M. 4. Stormy: rain early A.M.: rain P.M. 5. Cloudy: rain P.M. 6. Cloudy. 7. Cloudy: rain early A.M.: rain P.M. 8. Fine: rain and snow P.M. 9. Fine. 10. Rain. 11. Fine. 12—15. Fine: rain P.M. 16, 17. Cloudy. 18. Fine. 19. Cloudy: snow A.M. and P.M. 20. Cloudy: snow A.M. 21. Cloudy: snow melted. 22. Cloudy. 23—27. Fine. 28. Cloudy. 29. Fine.

Applegarth Manse, Dumfries-shire.—Feb. 1. Frequent showers. 2. Frequent showers: snow gone. 3. Frequent showers. 4, 5. Shower A.M.: fair rest of the day. 6. Rain very early: fine day. 7. Heavy rain A.M.: stormy P.M. 8. Occasional showers of rain and hail. 9, 10. Occasional showers of rain and hail with high wind P.M. 11. Fine day: a few drops of rain. 12. Storm of wind and rain P.M. 13. Fine day: no rain. 14. Fine day, but cloudy. 15. Wet morning: cleared up P.M. 16. Calm, cloudy, and mild. 17, 18. Fine A.M.: grew cloudy and sharp. 19. Cold easterly wind, but fair. 20. Cold easterly wind with slight frost and snow showers. 21. Cold easterly wind: frost: threatening snow. 22—24. Cold easterly wind: still frosty: sprinkling snow. 25. Cold easterly wind. 26. Beautiful sunny day, but still frosty. 27. Beautiful sunny day: frost very keen. 28. Cloudy all day: but still freezing. 29. Fine frosty day.

Sun shone out 25 days. Rain fell 13 days. Snow 2 days. Frost 10 days.

Wind north-easterly 6 days. Easterly $3\frac{1}{2}$ days. South-easterly 7 days. Southerly $3\frac{1}{2}$ days. South-westerly $8\frac{1}{2}$ days. West 1 day.

Calm $14\frac{1}{2}$ days. Moderate 8 days. Brisk $1\frac{1}{2}$ day. Strong breeze 2 days. Boisterous 3 days.

Days of Month, 1840.	Barometer.				Thermometer.						Wind.				Rain.				Dew point.
	Chiswick.		Boston. 8½ a.m.	Dumfries-shire. 8½ p.m.	Lond.: Roy. Soc.		Self-register. Fahr. 9 a.m.	Chiswick.		Dumfries-shire. Max. Min.	Lond.: Roy. Soc. 9 a.m.	Chiswick.	Dumfries-shire. Max. Min.	Lond.: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.	Dew point. Lond.: Roy. Soc. 9 a.m.	
	Max.	Min.			Max.	Min.		Max.	Min.										
1.	29.338	29.363	29.270	29.07	29.29	29.14	43.7	44.6	40.4	47	48	SE.	SE.	.038	.20	...	41		
2.	29.354	29.416	29.349	28.86	29.04	28.95	41.2	41.8	39.9	50	40	W.	SW.	.166	.09	.18	40		
3.	29.174	29.191	28.988	28.80	28.89	28.86	43.8	44.4	41.2	49	44	S.	SW.	.016	.18	.02	41		
4.	28.648	28.802	28.597	28.40	28.73	28.79	44.8	45.6	40.2	47	40	S. var.	SE.	.133	.30	.08	40		
5.	29.104	29.656	29.116	28.60	29.10	29.44	42.3	45.7	41.5	46	35	W.	NW.	.344	.02	.14	40		
6.	29.754	29.857	29.759	29.25	29.40	29.52	39.8	45.7	38.4	50	34	SW.	W.	.061	.02	.06	37		
7.	29.596	29.616	29.449	29.18	29.07	28.74	46.9	48.0	39.0	53	40	SW.	SW.	...	.03	.08	41
8.	29.532	29.682	29.559	29.05	29.06	29.25	43.8	51.0	41.0	47	32	W.	SW.	.075	.02	.07	40		
9.	29.724	29.759	29.722	29.27	29.32	29.10	38.0	38.7	35.5	47	43	S.	NW.	.066	...	.09	37
10.	29.580	29.796	29.588	29.10	29.05	29.34	47.4	48.4	37.2	51	37	S. var.	SW.	.013	.13	.04	42		
11.	29.950	29.975	29.945	29.50	29.57	29.52	42.2	42.8	40.5	52	45	S.	SW.	.091	...	.04	40
12.	29.724	29.781	29.715	29.26	29.29	29.18	47.4	48.3	41.9	50	35	S.	SW.	...	.02	...	42
13.	29.838	29.927	29.826	29.32	29.49	29.69	43.0	43.5	41.6	53	28	S.	SW.	...	...	.04	41
14.	29.956	29.966	29.957	29.55	29.78	29.72	35.2	50.2	35.3	47	26	S.	SW.	...	.18	...	38
15.	29.848	29.880	29.733	29.43	29.45	29.41	37.7	39.5	33.8	46	40	SW.	SW.	...	...	...	35
16.	29.772	29.954	29.796	29.30	29.55	29.80	46.7	47.3	37.0	51	44	SW.	SW.	.150	...	.11	40
17.	30.004	30.162	30.008	29.48	29.99	30.10	48.2	50.8	46.0	48	32	SE.	E. by S.	...	.06	...	41
18.	30.244	30.306	30.240	29.90	30.15	30.22	37.7	49.0	36.0	42	32	N.	E.	.055	...	...	35
19.	30.324	30.437	30.335	30.11	30.31	30.38	35.2	41.2	35.2	36	30	N.	E.	...	...	...	29
20.	30.450	30.515	30.475	30.45	30.45	30.45	33.5	36.6	32.8	33	30	N.	E.	.016	.05	.05	28		
21.	30.452	30.480	30.417	30.16	30.44	30.38	32.3	33.4	32.0	34	28	N.	N.	...	.28	0.0	26
22.	30.324	30.362	30.286	30.10	30.30	30.28	32.7	33.8	31.0	34	24	N.	N.	...	...	...	24
23.	30.224	30.287	30.265	30.10	30.38	30.28	29.5	34.6	28.0	36	24	N.	N.	...	...	...	25
24.	30.376	30.547	30.407	30.15	30.35	30.46	30.7	35.0	27.8	41	26	N.	N.	...	...	...	24
25.	30.596	30.661	30.609	30.27	30.50	30.50	35.3	37.4	30.7	44	25	N.	N.	...	...	...	25
26.	30.596	30.637	30.563	30.33	30.53	30.48	35.2	35.6	32.8	40	32	N.	N.	...	...	...	23
27.	30.468	30.549	30.438	30.15	30.44	30.36	34.7	35.3	33.6	40	32	N.	N.	...	...	...	30
28.	30.316	30.359	30.271	30.10	30.30	30.31	34.6	35.2	33.6	45	32	N.	N.	...	...	...	27
29.	30.356	30.414	30.369	30.05	30.35	30.40	36.0	36.7	33.6	45	28	N.	N.	...	...	...	31
Mean.	29.918	30.011	29.898	29.53	29.740	29.795	39.3	42.4	36.5	44.96	34.00	38.2	40.3	Sum. 1.224	1.25	1.28	2.62	Mean. 34.9	

ANNALS OF NATURAL HISTORY.

XVI.—*On the Irregular Form of the Flower of the Papilionaceæ.* By H. WALPERS*.

THE irregular form of the flower of the *Papilionaceæ* has given rise to the most varied explanations, to such an extent indeed, that the enumeration of all the opinions hitherto advanced respecting the origin of this form, which, according to the point of view in which they have been considered, differ essentially from one another, would occupy too much space to be stated here. It might consequently appear almost superfluous to increase the great number of theories advanced on this interesting subject by another; and I would on that account have held back my views, which differ from all hitherto brought forward, did I not find them to be confirmed by all the researches which I have made relative to the subject.

The pod so peculiar and so characteristic (*legumen*) belonging to the entire family of the *Leguminosæ*, must, from its disposition, be regarded as the single carpel of a five carpellary fruit. DeCandolle has already drawn attention to this, without any botanist however having hitherto made use of this fact, (proved by the pentagynous genus *Affonsea*, A. St. Hilaire,) in explanation of the irregular form of the papilionaceous flower. These five pods of *Affonsea* are arranged in a circle, so that their superior seminiferous sutures are situated innermost; the individual pods have therefore to be considered as *eccentric* from the imaginary floral axis which passes through the point of union of the margins of the pods. Of these five ovaries normally *four* become abortive, from reasons it is true unknown, and a single one only remains, although exceptional cases occur of two and three ovaries in *one* flower. This sole remaining ovarium stands eccentric from

* Translated from the Linnæa, ein Journal für die Botanik, Part IV. Vol. xiii. 1839.

the imaginary floral axis, and generally has lengthwise a laterally compressed form arising from the unilateral adhesion of the ovules.

The pod of the *Leguminosæ* from its situation must always be viewed as that one of the five carpellary fruit which is furthest removed from the floral axis,—it is then the inferior ovarium in the flower which is developed, while the four superior ones prove abortive; for I have found the *flores resupinati* of the *Leguminosæ* on more accurate examination to be constantly produced by the twisting of the peduncle. This twisting it is true usually takes place in the bud state, and descriptive botany has rarely taken this into consideration.

The eccentricity of the individual ovaries from the floral axis is demonstrated not merely by the *Affonsea* which has been already mentioned, but also by those cases where several ovaries occur in one flower; thus I have observed in *Cæsalpinia digyna*, Willd., Herb. No. 8026, that the two ovaries do not stand as might be expected with their broad sides parallel with one another, but in imperfect opposition, so that on the one (the right) side, one, and on the other (the left) side, two ovaries must be supposed to have been abortive.

The calyx in all *Papilionaceæ* is composed of five sepals, corresponding to the number of petals*; these enter into the most varied cohesions *inter se*; in most cases, however, they are united at least to some extent into a tube or cup, &c. and only free at the apex. Exceedingly few cases of the calyx occurring quinquepartite to the base in the fully developed papilionaceous flower are mentioned by authors, although in the embryonal state of the bud, as Schleiden and Vogel have demonstrated in their excellent ‘*Beiträgen zur Entwicklungs-geschichte der Blüthentheile bei den Leguminosen*,’ (Nov. Act. Ac. Cæs. Leop. Carol. Nat. Cur. vol. xix. p. 1.) all the subsequently cohering parts of the flower are then free, and in the course of development these parts, still consisting of delicate parenchyma, at first cohere from intimate reciprocal pressure.

* Strange enough, Bischoff still describes the *corolla papilionacea* as generally consisting of *four* petals.—Handbuch der botan. Terminologie, p. 333.

The cause of the cohesion is correctly explained by the reciprocal pressure in the flower bud, without however contributing in any way to the explanation of the very remarkable irregularity of the flowers.

The cohering-leaved calyx, however, as well as the position of the ovarium with respect to the other floral parts, appear to furnish the best explanation of this irregularity.

From the double circle of anthers present in all decandrous *Leguminosæ*, and actually to be observed in the embryonal state of the floral bud, we obtain an explanation of the alternation of the petals and ovaries which we find realized in *Affonsea*, and indicated in the other one-podded *Leguminosæ* by the position of the ovarium between the two carinal petals. This ovarium is during the flowering period in general sessile, or merely provided with so short a petiole that it does not project out of the tubular calyx. Consequently an action on the other floral parts cannot be denied to this ovarium, as it frequently attains to a considerable size, and this action is manifested by pressure on the adjacent organs, which on that account are greatly inclined to cohesions in their still parenchymatous consistency. Since the petals in proportion to the length of the calycinal tube can generally only be designated as shortly unguiculated, nay in several genera a great portion of the *lamina* is even still situated in the calyx, the lateral petals standing nearest to the ovarium cohere at their inferior margins very frequently, where the pressure which the calyx and ovarium jointly exert is most powerful, and form the carina. This pressure is even so considerable in the genus *Jonesia*, Rxb., that the petals are from the first entirely suppressed, and further the ovarium coheres at its inferior suture through its entire length with the perianthium, as I have observed in several undescribed species of this highly instructive genus. In the *Cæsalpinieæ* there are several genera with only from 1 to 3 petals, these then constantly stand in the place of the *vexillum* and of the wings (*alæ*).—Perhaps the absence of the other petals may be deduced from hence? Direct observation can only decide this question. Yet we observe in *Tamarindus Indica*, L., at the place where the two absent petals should

have stood, two minute scales, which appear to be the rudiments of the petals.

The flower of the *Leguminosæ* acquires a laterally compressed appearance from the abortion of the four superior ovaries; and I am not aware of a single case where the flower of any one of this family corresponds exactly to the scheme properly deducible for it.

The petals forming the carina are, as is well known, those standing nearest to the ovarium; and they must therefore, in the true papilionaceous flower, be those situated innermost; and indeed they always closely surround the ovarium and proceed perfectly parallel with it. The two following petals, or the wings, retain their original position, and place themselves, in consequence of the lateral compression of the entire flower, over the carinal leaves, with which, by the too great pressure and considerable development of the former (as in several *Phaseoleæ* and many *Trifolieæ*) they frequently cohere at their base, naturally however above the unguis. But they are generally prevented by the gamosepalous calyx from developing and spreading themselves freely as they would otherwise do. The last petal, the *vexillum*, opposed to the ovarium at its upper suture, stands both from its situation as well as position,—as may be distinctly seen in numerous *Sophoreæ*,—furthest from the ovarium, consequently meets with the fewest hindrances to its independent development, and thus frequently attains to a considerable size in proportion to the other petals: this also depends on the stronger nutriment, which in consequence of its distance from the ovarium appears to be conveyed to it through the calyx. Thus then in the bud at least the vexillum will be folded round the other petals and inclose them, whence arises the well-known vexilla-covering æstivation (*æstivatio vexillaris*) of the *Papilionaceæ*.

If the petals are very narrow, and the calycinal tube very long and narrow, they at times cohere through their whole length at their margins to a tube whose border exhibits five incisions which open according to the type of the papilionaceous flower, as in many *Trifolieæ*.

If on the contrary the calycinal tube is very short and broad, and the calyx thus surrounds the other floral parts but very loosely—as in most of the *Sophoreæ*—then indeed the carina is formed of two non-cohering petals, nevertheless the papilionaceous flower is still easily recognizable. This case has also a similar action on the stamina, which are then likewise free or only cohering at their base.

The stamina, which in the *Papilionaceæ* are with few exceptions always to the number of ten, stand, as is well known, in *two circles* around the ovarium. These two circles, it is true, are in most cases, from the cohesion of the filaments, very indistinct; yet in the young bud, as also in the perfectly developed flower of some *Sophoreæ*, they are clearly to be distinguished; and they are likewise indicated in numerous other *Papilionaceæ* by the alternate similar or sterile anthers (in this case it is constantly the inner circle which is sterile), and also by the alternately longer and shorter filaments. The stamina present but a very slight surface of opposition to the outer pressure, and on that account are subject to the most varied cohesions—the more so as they are situated nearest to the ovarium; nevertheless they are always more or less free at the apex, and I am only acquainted with a few cases where the anthers are directly sessile on the staminal tube.

Hitherto the following modifications of cohesion of the stamina have been observed:—

- a. The stamina cohere in a perfectly closed tube.
- b. The stamina cohere in a tube slit at the upper side, either in its entire length or only partially.

Here two cases are possible:

- a. The staminal tube is slit from the apex downwards.
- β. The staminal tube is slit from the base upwards. This is the rarer case.
- c. The stamina cohere in a tube slit at the lower side along its whole length. Very rarely.
- d. Nine stamina cohere to a tube slit superiorly; the tenth, belonging to the inner staminal circle, and standing opposed to the ovarium, is in its entire length free.
- e. The stamina cohere in two bundles of 5 and 5 through-

out their whole length; and as these two bundles stand on each side of the ovarium, they must be imagined to have originated from a staminal tube slit superiorly and inferiorly at the same time.

- f.* Of the ten stamina, *that* standing at the upper and *that* standing at the lower floral pole are free in their whole length (the first belongs to the second or inner, the latter to the first or outer circle); the other 8 stamina are situated in bundles of 4 and 4 on each side of the ovarium. (This case has hitherto been observed only in *Platypodium*, See 'Linnæa,' vol. xii. p. 420.)

Besides these, the stamina at times cohere more or less with the petals. The case most frequently occurring is the cohesion of nine stamina to a superiorly slit tube with a tenth free filament, and is to be explained thus: the tenth stamen, opposed to the suture of the pod, stands furthest from the ovarium, and is consequently the least subjected to pressure and the cohesion arising therefrom. That this is actually the case is moreover evident from the stamina situated superiorly on both sides of the ovarium entering successively into a more and more intimate cohesion towards the inferior floral pole, so that the stamina following on each side the free stamina, which belong to the outer circle, are frequently but slightly connected with the rest, while the succeeding ones cohere higher and higher,—a statement, which will be found to be confirmed in the greater number of diadelphic *Papilionaceæ*.

The other cohesions above-mentioned must also be explained in the same manner, from the general or partial, greater or smaller pressure which the stamina have to suffer from the adjacent floral parts; and there consequently exists no reason, as is also evident from the above-mentioned valuable researches of Schleiden and Vogel, for denying to the merely *mechanical* influences all action on the form and position of vegetable organs, as many botanists have done who have endeavoured to reduce all phænomena of vegetative life to the influence of higher influences, which unfortunately in most cases approaches near to scientific mysticism, by which little good is gained.

Yet as there is no rule without at least an apparent exception, there may be persons who can bring forward a number of facts which appear to speak against the correctness of the theory here advanced; but these exceptions serve, as far as I have hitherto become acquainted with them, only to confirm and extend the above positions, which I only maintain for the true *Papilionaceæ* sufficiently well characterized by their *æstivatio vexillaris*.

One might mention, for instance, the large groups of the *Cæsalpineæ* and *Mimoseæ*, which can scarcely be separated from the family of the *Leguminosæ*, in which the almost regular five petalled corolla now and then occurs together with the characteristic pod, as not being in harmony with the law above stated for the *Papilionaceæ*, although the forms of flower which here occur are nothing more than modifications produced by that law.

The *Cæsalpineæ* are distinguished in addition to the erect embryo, which is of no importance in our inquiries, from the *Papilionaceæ* by the imbricate, the *Mimoseæ* by the valvate, *æstivation*.

The former appears to be produced by the calyx in the *Cæsalpineæ* being generally quinquepartite to the base; it is therefore not able to inclose the floral parts so tightly and to press them on one another, as a gamosepalous calyx; the petals can consequently develope more freely and adopt that *æstivation* originally peculiar to them.

In this case almost all the petals are of like size and form; they expand freely, not being prevented by the calyx, and approach in their outer appearance more to the rosaceous corolla than to the papilionaceous: the stamina likewise rarely cohere *inter se*, and we here find them arranged in two circles. If on the contrary the calyx is cohering (*Coulteria*, Hb. B. Kunth, *Cæsalpinia*, L., &c.) we immediately find the papilionaceous corolla make its appearance.

Further, when the ovarium in the *Cæsalpineæ* is spherical or cylindrical, then it will be less eccentric than the usually occurring compressed ovarium; its axis will approach nearer to the imaginary floral axis than is otherwise the case, for it

will at all events adopt that position in which it meets with the least opposition ; it will consequently approach the upper floral pole, where the other four abortive ovaries would have stood—an appearance which, although in a slight degree, we also find in the true *Papilionaceæ*—by which the reciprocal pressure of the individual floral parts on one another becomes more equalized. The irregularity of the flower diminishes however in the proportion in which this equality is established. The calyx in this case is nearly regular (*Hymenæa*, &c.), and just so the corolla dependent on it ; although frequently, as a sign of the still perceptible eccentricity of the ovarium, a slight irregularity of the floral parts is evident.

If lastly the calyx is indeed gamosepalous tubular, but if the petals are provided with claws which exceed the calycinal tube in length, or if they cohere with it in their whole length, both which cases are of frequent occurrence in the *Mimoseæ*, then all reason for irregularity of the corolla disappears of itself, the corolla as well as the calyx are regularly quinquepartite or expanded rosaceously, and since the petals are then constantly acuminate, they can no longer cover one another laterally in the bud, but are merely folded valvately (*æstivatio valvata*). The stamina here frequently occur in very considerable number, and then, in consequence of the increased pressure by the inferiorly narrow calycinal tube, frequently cohere *inter se*, although above the tube they are perfectly free. At the same time the calycinal tube is here so narrow that there can no longer be a question as to a sensible eccentricity of the ovarium ; and the influence which this would exert on the form of the corolla seems to be thus suspended, from the ovarium being frequently provided with a considerably long stipes, which appears to destroy the reaction against the unilateral pressure of the calyx, since it is but feeble. In this group we find the case, already frequently mentioned, of a pentagynous leguminous plant, which we have considered of such importance in explanation of the papilionaceous flower.

EXPLANATION OF THE FIGURES.

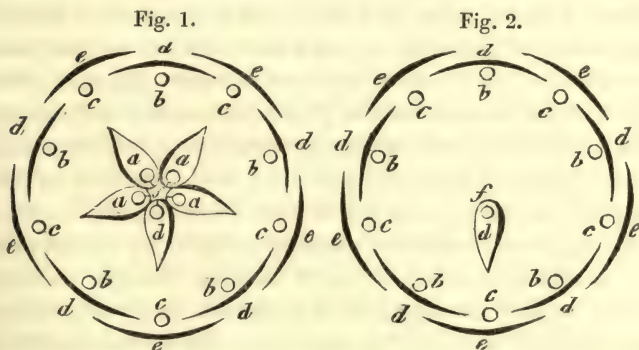
Fig. 1. Diagram according to which the papilionaceous flower is constructed as regards disposition, and which actually occurs in *Affonsea*, St. Hil.

- a, a, a, a.* The abortive ovaries in the papilionaceous flower, *a'* the remaining ovarium.
- b, b, b, b.* Second inner staminal circle alternating with the ovarium.
- c, c, c, c.* Second outer staminal circle opposed to the ovaries.
- d, d, d, d.* Petals alternating with the ovaries.
- e, e, e, e.* Sepals opposed to the ovaries.
- f.* Imaginary floral axis.

Fig. 2. Diagram according to which the papilionaceous flower is actually constructed. Similar to the former, but the abortive ovaries *a, a, a, a*, are omitted.

Fig. 3. Diagram of a diadelphous papilionaceous flower.

- a.* Ovarium.
- b.* The tenth free stamen belonging to the inner circle.
- c.* The superiorly slit tube formed of the other nine stamens.
- d'' d''.* The two petals cohering at their inferior margin forming the carina.
- d' d'.* The two wings; *d* the vexilla.
- e, e, e, e.* Sections of the calyx.



XVII.—On the Structure of the Ovule in Plants. By M. J. SCHLEIDEN, M.D., Professor of Botany in the University of Jena*.

LINNÆUS established a fixed period for the description of the organs of reproduction ; namely, for the floral organs the fully developed flower at the moment of the diffusion of its pollen ; for the fruit, on the other hand, the moment of maturity, *i. e.* in general, the natural separation of the fruit from the plant ; and in so doing he was perfectly right. Linnæus undoubtedly described well, for what he could not see with the naked eye or with a moderate lens he passed over in silence. But it was soon felt requisite to pay attention to parts not perceptible to the naked eye ; and more especially since a preference has been given to the natural arrangement of plants has it been found necessary to take into consideration the structure of the ovule. Now-a-days, indeed, it is pretty generally the case that but few physiological botanists take the trouble to inquire into the structure of the ovule and the development of the seed, and the more systematic botanists borrow their statements upon trust and faith, or without such warrant judge of the structure of the ripe seed, *mutato nomine*, from the ovule†. He, however, who is not totally ignorant of the history of the development of plants knows very well that the gradual changes resulting from progressive development are frequently so considerable, that even the reduction of later stages to the earlier ones which have been actually observed is quite impossible without constantly following the progress of development. Thus it seems singular enough, when describers with an air of great seriousness, as if they had actually observed it with their own eyes, talk for instance of an

[* Translated from Wiegmann's Archiv, p. 282. Part IV. 1839. We here beg to acknowledge our thanks to the author for the kind communication of separate copies of this and other interesting Memoirs.—R. T.]

† That frequently accident or fancy have the principal share, is among other things proved by the position of the *Nymphæaceæ* in Kunth's excellent 'Flora Berolinensis,' otherwise entirely arranged from personal and new observations. That in such a work the *Nymphæaceæ* should be classed under Monocotyledons, and indeed, as *Butomeis proxime affines*, and that the researches of Brongniart, Mirbel, Brown, and Lindley should be entirely passed over, is scarcely conceivable.

ovarium uniloculare, ovulo pendulo in *Viscum*, or in *Corylus* of an ovarium *biloculare, ovulis initio erectis mox pendulis**; happily their disciples are kind enough to believe the teacher upon his word, or otherwise they might easily devote their life in vain to find such pretty descriptions confirmed by nature.

But if at last, and indeed with perfect justice, an essential value has been placed on the description of the formation of the ovule, and if we are every day more and more convinced that a plant is not a crystal which can be laid aside today, and ten years afterwards found in the same state, but that engaged in constant, active, and lively development, it sometimes manifests this side of its life, sometimes that, and thus every moment escaping the observer, it nowhere can be conceived as a process terminated in a given moment, but solely as the idea of several stages of development, and as the collective expression of an uninterruptedly continuing process; then indeed it is evident that by the present mode of proceeding science is not much advanced; and that on the one hand, a fixed moment must be established for the description of the structure of the ovule according to Linnæus's notions; but, also, on the other hand, that the progress of development must be indicated, through which apparent differences at certain periods may be reconciled with a higher unity, while apparent resemblances are resolved into their proper members according to the different principles of development. Here again Robert Brown is the name which first trod the right path and indicated what is required of us, although, as in many other cases, without any one making use of or following up his ingenious indications. Robert Brown, struck by the apparent contradiction in finding in the same genus (*Euonymus*) both pendent and erect ovules at the same time, inquired further, and discovered the law, that the *raphe* in the ovule constantly passes along the side directed towards the *placenta*; that in the *ovula pendula* of *Euonymus* this is not the case, but that they become *ovula erecta*, if in imagination we again bring the *raphe* into the right position; that therefore the ovules of this plant are only apparently pendent (pro-

* Of course, *ovarium* in its state at the time of flowering is here intended.

perly speaking curved downwards), but in reality erect. The correctness of this statement is confirmed by the history of development. As far as I am aware, no one has profited by these inquiries of Brown, in order to solve similar anomalies which obscure the clear perception of affinity; for which object the *Ranunculaceæ* present an excellent opportunity. The one-seeded plants of this family have been divided according to the difference of pendent and erect ovules (?) into *Ranunculaceæ* and *Anemoneæ*; and botanists have remained content with believing in such an important distinction even between plants so nearly allied to each other. But the ovule in these two divisions is at a not very early state exactly similarly constructed, and is *ovulum adscendens anatropum*, figs. 1—2; at a subsequent period the *ovarium* either grows alone upwards, when we have an *ovulum erectum anatropum*, fig. 3, or the ovary is compelled to employ for its development the space

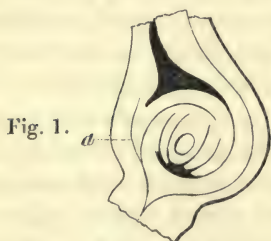


Fig. 1.

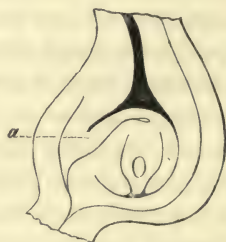


Fig. 2.

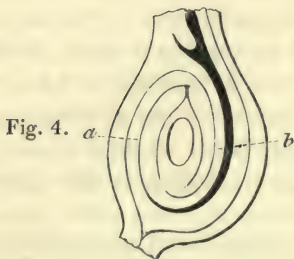


Fig. 4.

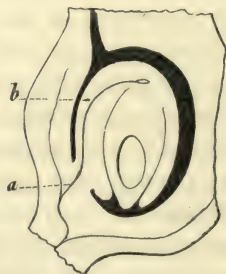


Fig. 3.

below the ovulum, which then curves from the *placenta* downwards and becomes *spurie pendulum*, *anatropum raphe aversa*, fig. 4. In several species no difference is perceptible at the time of flowering (for instance between *Ranunculus* and *Myosurus*); and in all the others intermediate forms run so gra-

dually together, that the difference alluded to is absolutely incapable of being employed as a ground of division at the time of flowering; when the seeds are ripe it then indeed affords a well-defined distinctive character. But since we have genera which cannot be divided (*Euonymus*) in which this double form occurs, such a character can in no case be made use of to establish and justify a division, unless nature evidently indicates it otherwise; and indeed the less so, when, as in *Ranunculaceæ*, nature has set no value on the structure itself of the ovule, and when peculiarities otherwise most constant within the limits of family are found to be among the most variable. Of this nature is the number of integuments of the ovule, which in *Ranunculaceæ* vary even in the same genus.

With an *integumentum simplex* there are, *Thalictrum*, *Aнемone*, *Hepatica*, *Ranunculus*, *Ficaria*, *Caltha*, *Helleborus*, *Delphinium tricornе* and *chinense*, and the *Podophylleæ*.

With an *integumentum duplex* there are, *Clematis*, *Adonis*, *Trollius*, *Isopyrum*, *Aquilegia*, *Aconitum*, *Pæonia*, *Delphinium fissum*, *elatum*, *bicolor*, *consolida*, *Ajaxis*, and the *Magnoliaceæ*.

So great is the difficulty of examining most plants of this family with reference to the original structure of their ovule, which in general is no longer to be recognized even in the developed bud, that I will not assert that some error may not have crept into the preceding enumeration (perhaps in *Delphinium*). But if, as I trust, the greater part is correct, then the conclusion is justified—that the number of integuments, which is of fixed constancy in most other families, here appears as a totally variable and consequently secondary character, according to which alone the family can neither be restricted nor extended.

An example of similar anomalies also occurs in the family of the *Aroideæ*. Here there is nothing constant in the formation of the ovule, but the *integumentum duplex* pertaining to all Monocotyledons. We find moreover in this family *ovula erecta* (*Arum*), *pendula* (*Pothos*), *atropa* (*Sauromatum*), *hemianatropa* (*Meconostigma*), *anatropa* (*Calla*), and even *hypertropa* (*Orontium aquaticum*). Robert Brown united *Typha-*

ceæ with *Aroideæ*; Lindley subsequently separated them, and as it appears*, chiefly on account of the pendent ovules. Not to mention that the ovules are not unfrequently pendent in *Aroideæ*, which Lindley has forgotten; it is also to be observed that the ovules in *Typhaceæ* are only *spuriè* pendula, for in them also we meet with the *raphe aversa*.

DESCRIPTION OF THE FIGURES.

Fig. 1. Adonis vernalis. Longitudinal section of the *ovarium* just before the expansion of the flower.

a. Placenta. In the fully developed flower, the form of the ovulum scarcely changed.

Fig. 2. Ranunculus repens. The same.

Fig. 3. Ranunculus repens. Just after the expansion of the flower.

a. Placenta;—*b. Raphe*.

Fig. 4. Anemone nemorosa. Just after the expansion of the flower.

a. and *b.* As in the preceding figure.

XVIII.—On the Bone of an unknown Struthious Bird of large Size from New Zealand. By RICHARD OWEN, Esq., F.R.S.

THE bone of an unknown Struthious bird of large size, presumed to be extinct, has been placed by Mr. Rule, in the hands of Professor Owen for examination, with the statement that it was found in New Zealand, where the natives have a tradition that it belonged to a bird of the Eagle kind, but which has become extinct, and to which they give the name "Movie." Similar bones it is said are found buried in the banks of the rivers.

The following is an abstract of Profesor Owen's account of this bone, communicated to the Zoological Society, Nov. 12.

"The fragment is the shaft of a femur, with both extremities broken off. The length of the fragment is six inches, and its smallest circumference is five inches and a half. The exterior surface of the bone is not perfectly smooth, but is sculptured with very shallow reticulate indentations: it also presents several intermuscular ridges. One of these extends down the middle of the anterior surface of the shaft to about one-third from the lower end, where it bifurcates; two

* Upon a reference to Lindley's 'Natural System of Botany,' ed. ii. p. 365, it will be found that this is not an exact statement. That author's words are, "They (*Typhaceæ*) are generally regarded as a distinct tribe by most writers, and are surely sufficiently characterized by their *calyx being 3-sepalled and half glumaceous, or a mere bundle of long hairs, long lax filaments, clavate anthers, solitary pendulous ovules, and peculiar habit*."—ED.

other ridges or lineæ asperæ traverse longitudinally the posterior concave side of the shaft ; one of them is broad and rugged, the other is a mere linear rising.

“The texture of the bone, which affords the chief evidence of its ornithic character, presents an extremely dense exterior crust, varying from one to two lines in thickness ; then there occurs a lamello-cellular structure of from two to three lines in thickness. The lamellæ rise vertically to the internal surface of the dense wall, are directed obliquely to the axis of the bone, decussate and intercept spaces which are generally of a rhomboidal form, and from two to three lines in diameter. This coarse cancellated structure is continued through the whole longitudinal extent of the fragment, and immediately bounds the medullary cavity of the bone, which is about one inch in diameter at the middle, and slightly expands towards the extremities. There is no bone of similar size which presents a cancellous structure so closely resembling that of the present bone as does the femur of the Ostrich ; but this structure is interrupted in the Ostrich at the middle of the shaft where the parietes of the medullary, or rather air-cavity, are smooth and unbroken. From this difference I conclude the Struthious bird indicated by the present fragment to have been a heavier and more sluggish species than the Ostrich ; its femur, and probably its whole leg, was shorter and thicker. It is only in the Ostrich’s femur that I have observed superficial reticulate impressions similar to those on the fragment in question. The Ostrich’s femur is sub-compressed, while the present fragment is cylindrical, approaching in this respect nearer to the femur of the Emeu ; but its diameter is one-third greater than that of the largest Emeu’s femur, with which I have compared it.

“The bones of the extremities of the great *Testudo elephantopus* are solid throughout. Those of the Crocodile have no cancellous structure like the present bone. The cancellous structure of the mammiferous long bones is of a much finer and more fibrous character than in the fossil.

“Although I speak of the bone under this term, it must be observed that it does not present the characters of a true fossil ; it is by no means mineralized : it has probably been on, or in, the ground for some time, but still retains most of its animal matter. It weighs seven ounces twelve drachms, avoirdupois.

“The discovery of a relic of a large struthious bird in New Zealand is one of peculiar interest, on account of the remarkable character of the existing Fauna of that island, which still includes one of the most extraordinary and anomalous genera of the struthious

order, and because of the close analogy which the event indicated by the present relic offers to the extinction of the Dodo of the island of the Mauritius. So far as a judgment can be formed of a single fragment, it seems probable that the extinct bird of New Zealand, if it prove to be extinct, presented proportions more nearly resembling those of the *Dodo* than of any of the existing *Struthionidæ*.

“Any opinion, however, as to its specific form can only be conjectural; the femur of the Stilt-bird (*Himantopus*) would never have revealed the anomalous development of the other bones of the leg; but so far as my skill in interpreting an osseous fragment may be credited, I am willing to risk the reputation for it on the statement that there has existed, if there does not now exist, in New Zealand, a Struthious bird, nearly, if not quite, equal in size to the Ostrich.”

XIX.—*Miscellanea Zoologica*. By GEORGE JOHNSTON, M.D., Fellow of the Royal College of Surgeons of Edinburgh.

[Continued from vol. iv. p. 375.]

CONTRIBUTIONS TOWARDS A HISTORY OF THE IRISH ANNELIDES.

A LARGE collection of Irish Annelidans has been put in my possession by my friend Wm. Thompson, Esq. of Belfast. The collection was made partly by Dr. Drummond, Messrs. Ball, Hyndman, and Allman, but principally by Mr. Thompson himself, who had determined several of the species, and was well aware of the distinctions of others. As however the state of his eyes forbade him the long use of the microscope, he declined entering on their minuter examination,—a task which I have too willingly undertaken, for I was loath to lose this opportunity of having my name associated with those of the most zealous and distinguished cultivators of Irish zoology.

My attention having accidentally been called, in the first place, to the genus *Nereis*, I proceed to give the results of a careful examination of the many specimens of it in the collection, as well as of some others procured from other sources; and this will enable me to correct some blunders of a previous Essay, and to characterize anew all the species which have been hitherto ascertained to be natives of our shores. As of most natural and typical genera in every class of animals and of plants, the species appear to be numerous, and to resemble

each other so closely, that it is not, in some instances, easy to decide what should constitute their permanent diagnostics; or to express, in a few apt words, the minute shades of difference in certain organs which seem to mark them as distinct species. I am satisfied that, in this genus, the *form* of the body of specimens preserved in spirits will afford no specific character; and that as little reliance can be placed on *colour*, although this is perhaps more uniformly alike in living individuals. The *number of segments* is also, as Otho Fabricius long ago remarked*, liable to considerable variation, both from age and from mutilation; for if the posterior segments have been lost by accident they are indeed again renewed, but not in their original numbers or size; and moreover it is often very difficult to count the segments from the minuteness and crowding of the posterior ones. The pattern after which the *prickles of the proboscis* are arranged varies in some species, but it is almost impossible to define those variations in words, and the character fails us in the nearest allied species, where only it is required. Such is also the case with the *number of serratures* along the falcate edge of the jaws, though the character is one not to be neglected; but, from the peculiar shape of the jaw, I have sometimes found a difficulty in determining the exact number of these serratures; and, in other instances, have had a doubt whether one or two of them, from their obsolescence, ought to be reckoned. I place little value on any differences in the shape of the head, or in the proportions between the palpi and antennæ; but a specific character, it appears to me, may be justly founded on differences (1) in the proportion of the first or post-occipital segment to the second; (2) in the comparative lengths of the longest pair of tentacular cirri; but (3) principally in the variety exhibited by the lobes and appendages of the feet. Every foot, let it be remembered, consists of a superior and an inferior cirrus, three papillæ presumed to be branchial, and two tubercles

* "Ceterum numeravi sine respectu magnitudinis segmenta 56, 65, 76, 78, 86 in diversis; igitur de numero nil certi statui posse patet: hunc characterem etiam quam maxime vacillare facile credat, cui mutilatio et reintegrationis articulorum innotuit; sub reintegrando enim articulo caudali primum accrescente, reliquis vero successive, a momento conspectus numerus dependet."—Faun. Grænl. p. 292.

armed with compound bristles,—the superior tubercle being always situated between the dorsal and second papillæ, and the inferior tubercle between this and the ventral papillæ. On these particulars I will endeavour to define the British species before me; and I trust that, with the designs which illustrate the specific characters, the student will now be able to determine, with comparative ease and certainty, such of them as he may meet with in his researches.

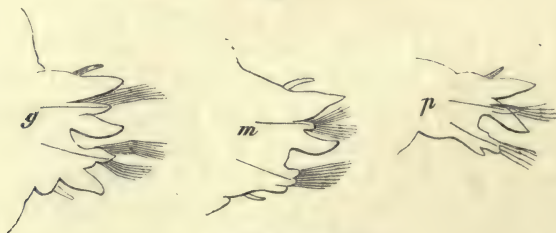
Genus NEREIS.

(*Nereis*, *Cuv. Reg. Anim.* iii. 201. *Aud. & M. Edw. Litt. de la France*, ii. 181.—*Lycoris*, (*Savigny*,) *Lam. Anim. s. Vert.* v. 311. 2de édit. v. 548.) For the character of the genus see *Annals of Nat. History*, iii. p. 289.

* Feet homologous.

1. *N. brevimanus*, post-occipital segment not longer than the second; tentacular cirri once and a half or twice its diameter; jaws with 8 serratures, the apices unarmed; feet homologous, the branchial papillæ subequal, the inferior coalescent with the setigerous tubercle on the posterior feet; cirri very short, not reaching the apex of their lobes; setigerous tubercles well-developed, the bristles smooth.

Fig. 1.



Nereis brevimanus.

Hab. Coast of Ayrshire, Mr. P. W. MacLagan.

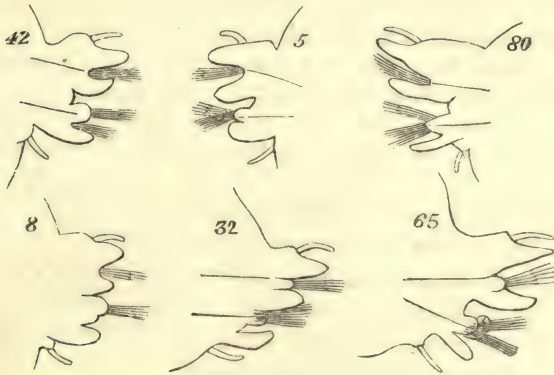
Worm about 3 inches long, and about the size of an earthworm of the same length. Head narrow: eyes very distinct: antennæ not projecting beyond the palpi: proboscis roughened as usual with black horny spinules: the serratures of the jaws coarse but not reaching to the point, which is plain. Segments about 88, narrowed posteriorly, the anal one terminated with rather long styles. The inferior branchial lobe becomes smaller as we trace the feet backwards, and near the

middle of the body forms almost a part of the setigerous tubercle (fig. *m.*), the union being still more complete on the posterior pairs of feet, on which also there is a mere vestige of the ventral cirrus (fig. *p.*). The colour of the specimens in spirits is a wax-yellow with a tinge of brown, and a dusky line across the margin of the segments.

This species very closely resembles *Nereis pulsatoria*, but in the latter the jaws are serrated to the apex, and the terminal joint of the bristles is finely serrulated along one edge.

2. *N. viridis*, post-occipital segment twice as long as the second; tentacular cirri once and a half or nearly twice as long as its breadth; jaws serrated to the point; feet homologous, with papillous subequal branchial lobes, the dorsal one (of the posterior feet especially) somewhat humped; superior cirrus scarcely reaching beyond the apex of its lobe; upper setigerous tubercle obsolete.

Fig. 2.

*Nereis viridis.*

Hab. Strangford Lough, Wm. Thompson, Esq.; co. Cork, Geo. J. Allman, Esq.

To the description of this species given (under the name of *N. pelagica*), in the Annals, vol. iii. p. 291, I have only to add that the jaws appear to have 10 serratures on their cutting edge. To show how far the feet of the same species may vary, I have given the above figures,—the three upper ones taken from an individual immediately after being killed by immersion in spirits,—the three lower ones from a specimen that had

been preserved for some years. It would have been easy to have multiplied figures exhibiting still other dissimilitudes, but the pattern, though modified, is always essentially the same. Some of these differences proceed from selecting feet of non-corresponding segments; others are produced by differences in the condition of the worm when killed,—for example, from its being filled with ova or not; and others again from a difference in the strength of the spirits in which the specimens are placed. In some specimens which had been long preserved, the post-occipital segment was scarcely larger than the one behind; but when alive the great proportional size of the former is always very obvious.

Though the specific name is less appropriate than it might be made, I have deemed its restoration better than the imposition of a new one; for the opportunity of consulting Muller's figure, afforded me by my kind friend Mr. Alder of Newcastle, has fully convinced me that this is not the *N. pelagica* of Linnæus, nor *N. verrucosa* of Muller. The true synonyms of *N. viridis* appear to be the following:

Nereis cœrulea, Penn. Brit. Zool. iv. 93. pl. 27. fig. sup. edit. 1812. Turt. Gmel. iv. 88. Turt. Brit. Faun. 135. Stew. Elem. i. 390.—*Lycoris viridis*, Johnston in Zool. Journ. iv. 419.—*Lycoris margaritacea*, Ibid. in lib. cit. 420; and in Mag. Nat. Hist. vii. 230.—*Nereis pelagica*, Animals Nat. Hist. iii. 290.

3. *N. pelagica*, post-occipital segment about twice as long as the second; tentacular cirri longer than its transverse diameter; serratures of the jaw not reaching the apex; branchial lobes of the feet papillary, subequal, the dorsal one more or less humped; superior cirrus twice as long as its lobe.

Fig. 3.

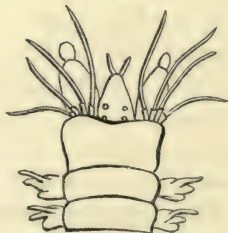
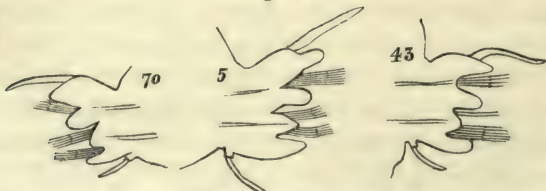


Fig. 4.

*Nereis pelagica*.

Hab. Shore of co. Cork, *Geo. J. Allman, Esq.*; Strangford Lough, *Wm. Thompson*; Bangor*, *Dr. Drummond*. (Orkney and Shetland, and coast of the Isle of Man, *Edw. Forbes*; Ayrshire, *Mr. P. W. MacLagan*.)

This species sometimes attains a length of 8 inches, with a thickness equal to that of a swan's quill. It is thicker in proportion to its length than *N. viridis*, and has the organs of the head more developed. The proboscis of both species are almost exactly alike armed, but the serratures of the jaws in *N. pelagica* do not reach the points, which are rather obtuse. The number of serratures on the jaw appears to be more than 10, but not more than 6 of them form prominent denticles on the edge. The segments vary from 80 to 90, and are marked with a few oblique striæ on each side above the feet, which are homologous and well-developed. The dorsal branchial lobe is rather larger than the others and somewhat humped; and from the front of the hump originates the cirrus, of nearly double its length. The inferior cirrus almost reaches to the tip of its lobe. The bristles are smooth.

The greater number of specimens preserved in spirits are of a uniform pearly iridescent colour with a slight tinge of brown or pink, but some specimens are of a dusky brown with glossy reflections.

The figure given of *Nereis pelagica* in the 'Encyclop. Méthod.' Vers, pl. 55. fig. 21—23, undoubtedly represents this species; hence it follows that it is also the *Nereis verrucosa* of Muller (Prod. p. 217), and of Otho Fabricius (Faun. Grœnl. p. 292.). That it is the *Nereis pelagica* of Linnæus is not so certain, for his specific character—" *N. segmentis XL. subtus sulcata*,"—is at variance with the fact; but as I can scarcely consent that any of our great master's species should be deleted from the "Systema," I willingly appropriate the name to the one before me; 1. because such was the opinion of Muller and Fabricius; 2. because Linnæus quotes as a probable representation of his species a figure of a worm in Baxter's Opusc. Subsc. tab. vi. fig. 6, with 70 segments and upwards; and 3. because it is very probable that there is not existing a species of *Nereis* with so few as 40 segments.

* It is the small town of this name on the coast of Down that is alluded to throughout the paper.

I have also scarcely a doubt of this being the *Nereis margaritacea* of Leach (Supp. Encyl. Brit. i. p. 451. pl. 26.), but Dr. Leach's character of the species is entirely generical; and Savigny and Milne-Edwards and Audouin have particularly described a *Nereis margaritacea*, which is not the same with the one before us, but more nearly related to *N. viridis*. Neither has this any relation to the *Nereis margaritacea* of the 'Annals,' vol. iii. p. 294, which belongs to a different section of the genus.

4. *N. bilineata*.

I have nothing to add to the character and description of this species given in the 'Annals,' iii. p. 295. It does not occur in the Irish collection.

5. *N. Dumerilii*, post-occipital segment equal in length to the second; tentacular cirri 3 times longer than its breadth; jaws serrulated; branches of the mid and posterior feet widely separate, the lobes papillary, divaricate; superior cirrus projecting far beyond the apex of its lobes. Aud. and Edw. Litt. de la France, ii. p. 196.

Fig. 5.

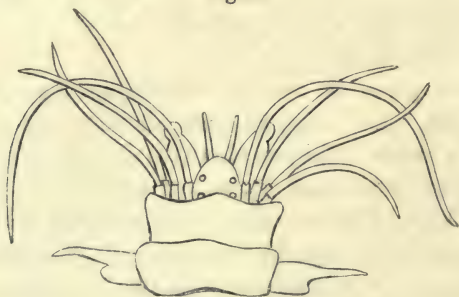
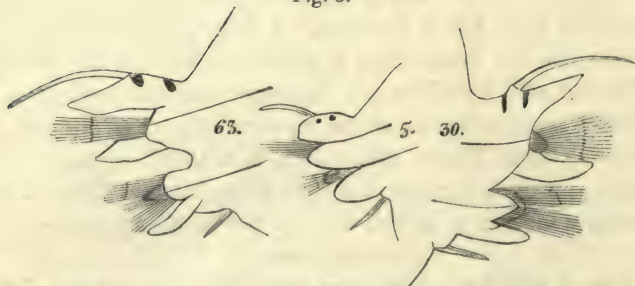


Fig. 6.



Nereis Dumerilii.

Hab. Apparently not unfrequent on the Irish coast. Strangford Lough, and elsewhere on the coast of Down, *Wm. Thompson, Esq.*; Belfast Bay, *Dr. Drummond.*

Body vermiform, flattish or rarely subcylindrical, as thick as a goose-quill, only slightly tapered backwards, smooth, flat on the ventral surface, which has the median line faintly impressed. Head small, armed as usual: eyes very large: jaws small, with brown apices, serrated along the edge to the tip or nearly so: tentacular cirri 3 times as long as the diameter of the post-occipital segment, which is of about the same length as the next, and rather narrower. Segments about 80, narrowish, thickened above the origins of the feet, which are well-developed and most crowded on the posterior half of the body. Feet of the anterior segments with 3 short obtuse branchial lobes, the dorsal one more prominent than the others, and the setigerous tubercle minute: of the middle and posterior feet the branches are widely remote, with the branchial lobes of the superior branch nearly equal, divaricate, and a large brush of bristles between them: the inferior lobe rather small and simple: superior cirrus twice as long as its lobe: inferior cirrus rather short: spines dark brown: bristles numerous, pale yellow, smooth and slender.

In spirits the worm is generally of a uniform cream or ochre-yellow colour, with a brown line across the front of every segment, and there are two spots of the same or of a rich yellow colour at the base of the dorsal lobe of every foot. These spots appear to be constantly present, and consequently afford a good character of the species, but they are sometimes less perceptible than is desirable.

6. *N. fucata*, first and second segments nearly equal; ten-

Fig. 7.



Nereis fucata.

tacular cirri not longer than the head; jaws finely serrulated;

feet oblique, the dorsal lobe disproportionably larger than the others and more prominent, strongly humped, with a cirrus twice as long; inferior cirrus reaching to or beyond the apex of its lobe. Aud. and Edw. Litt. de la France, ii. p. 188.

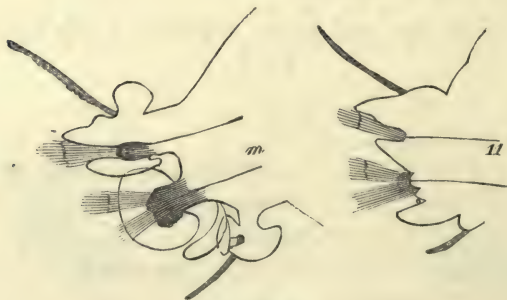
Hab. Down Coast, Wm. Thompson, Esq.

The single specimen in the collection was about 5 inches in length and as thick as a large swan's quill: the colour was a blueish gray with a pearly lustre, but the feet were a dusky reddish brown, and this colour had tinted the posterior half of the body. Head small, the palpi projecting beyond the antennæ: proboscis armed as usual; the jaws slender with dark brown apices, serrulated along the whole falcate cutting edge: tentacular cirri not longer than the breadth of the post-occipital segment, which is nearly of the same size as the one behind. Segments about 90, with well-developed feet, which are more distinctly stalked than usual, and their lobes are very obliquely placed in relation to each other. The dorsal lobe of all the feet is largest, humped, and furnished with a cirrus hanging far beyond its apex; but on the middle and posterior feet this lobe becomes greatly larger, and is raised abruptly into a large hump, in front of which the cirrus originates. On the posterior extremity the hump advances, so to speak, on the foot, and leaves only a small papillary apex, over which the long cirrus hangs. The inferior cirrus is longer than its lobe. The spines and bristles present no peculiarity.

**** Feet dissimilar, the posterior with foliaceous lamellæ.**

7. *N. renalis*, jaws with 5 strong serratures; proboscis

Fig. 8.



Nereis renalis.

prickly; posterior feet with 3 foliaceous lamellæ, of which the

upper one forms a helmet-shaped crest on the dorsal lobe; the mid one a large kidney-shaped leaf to the setiferous tubercle; and the other, also kidney-shaped, is attached underneath the ventral cirrus; dorsal cirrus much overreaching its lobe.

Hab. Bangor, Dr. Drummond; (shores of the Isle of Man, Mr. Edw. Forbes; Berwick Bay, G. J.)

Body rather flattish, about 4 inches long, very slightly tapered to the tail, which is obtuse and terminated with two short styles. Head distinct, obtusely triangular, pointed in front with the antennæ, which project beyond the palpi: eyes large, occipital: proboscis armed with prickles as usual: jaws chestnut-brown towards the apex, serrated with 5 denticulations: tentacular cirri as long as, or longer than, the breadth of the body: post-occipital segment rather larger than the one behind: segments about 110, smooth, marked with two or three rugæ above the insertions of the feet, which are well-developed and crowded on the posterior half. Anterior feet normal, with short papillary branchial lobes, of which the dorsal one is the largest and most prominent. The posterior feet are complicated and much unlike the others, for above the base of the superior lobe there is a helmet-shaped compressed crest; and the superior setigerous tubercle is also furnished with a very large kidney-shaped veined leaf-like lamina, under which there is a small oblong lobe; while the ventral cirrus has appended beneath its base another kidney-shaped leaf-like lamina, and a curved lobule on its upper side. Dorsal cirrus much longer than its lobe; that of the middle feet crenated on the under side: ventral cirrus rather long. Bristles slender, forming considerable brushes on the middle and posterior feet: spines dark brown.

Specimens preserved in spirits are of a uniform pearl-gray colour with pale yellowish feet.

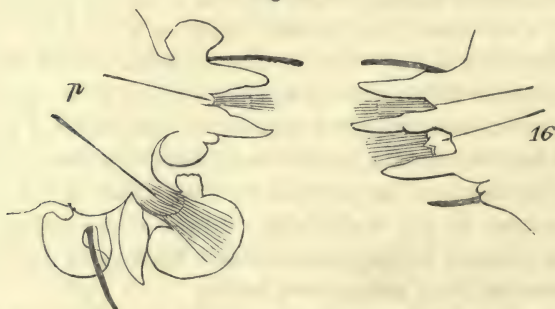
Nereis renalis is in many respects so much like the *N. lobulata* of Savigny that I have hesitated in describing them as distinct species; but the dissimilarity in the structure of the feet, though apparently slight and difficult to be expressed in a definition, seems to be of a kind that nothing less than specific origin could produce. In *Nereis lobulata* the leaf-like

lamina of the setigerous tubercle is oval and not more than half the size it has in *N. renalis*; and the foliaceous appendage to the ventral cirrus in the former is also proportionably small, and of a roundish figure, without any additional lobular appendage.

Nereis margaritacea, described in the 'Annals,' vol. iii. p. 294, is also nearly allied to this species, and is, I suspect, the same as the *Nereis podophylla* of Savigny. It requires re-examination; and I would remark, that as these species are easily injured, and their appendages tear and fold up readily, several feet ought to be examined before fixing on their true shape and character. I had made several figures of the feet of *N. renalis* before the one now given, which, I believe, exhibits a correct outline of its ordinary conformation.

8. *N. longissima*, jaws obsoletely serrated at the base, plain towards the points; proboscis without prickles; upper branchial lobe with a helmet-shaped crest, the setiferous tubercle with large kidney-shaped lamellæ, and a smaller one of the same figure is appended to the base of the ventral cirrus; superior cirrus rather longer than its lobe.

Fig. 9.

*Nereis longissima.*

Hab. Coast of co. Down, Wm. Thompson, Esq.

The specimen before me is of the extraordinary length of two feet! but as it has become very soft in the spirits, it would perhaps not much exceed 18 inches when alive. It is of the thickness of a goose-quill, and of a pearl colour with olivaceous feet, which are very large and flexile. Head di-

stinct, rather small, obtusely triangular; the antennæ minute and shorter than the palpi; proboscis large, destitute of all horny prickles, but armed with powerful jaws, which are only faintly serrulated near the base. Post-occipital segment not larger than the second: tentacular cirri short, not so long as the breadth of the segment. Segments very numerous: feet of the anterior pairs with 3 rather long papillary and equal branchial lobes, the dorsal cirrus not reaching much beyond their apices; but the posterior feet much resemble those of *N. renalis*.

Although the size of an animal is not usually reckoned a good specific character, yet we know that every species has in this respect certain limits which it never either much exceeds or falls short of. For this reason it seems to me impossible to regard *Nereis longissima* as a variety of *N. renalis*, notwithstanding the similarity in the structure and figure of the feet would induce that belief; and I have been fain to resort to the distinctions afforded by the jaws and proboscis for their separation. This is the only known species with a prickless proboscis, and the serratures of the jaws are likewise fainter than in any other I have examined. As the specimen of *N. longissima* is not in a good condition, some allowance will be made, should the outline given of the posterior foot be found not wholly exact, but I am confident that the general contour and proportions are accurately expressed.

Before I examined this worm I had mistaken it for a species of *Phyllodoce*, which it more resembles in size and general aspect than a *Nereis*, and it is obviously a *transition* species, proving the affinity of these two genera. The foliaceous lamellæ of the feet are quite similar in structure to the branchial leaflets of the *Phyllodoce*, and from the manner in which they are veined, are evidently also branchial in their function.

N.B. The numbers affixed to the figures express the number of the segment from which the foot was taken that served for the figure: *m* means that the foot was from near the middle; and *p* from near the posterior extremity of the body.

[To be continued.]

XX.—On the *British Actiniadæ*. By EDWARD FORBES, Esq.

[With a Plate.]

I. SUCH Actiniadæ or simple soft Helianthoid Polypes as are found in the seas of Britain may be arranged under five genera, namely, *Lucernaria* (Muller), *Anthea* (Johnston), *Actinia* (Linnaeus), and two which I propose to constitute under the names of *Adamsia* and *Iluanthos*, the first for the reception of the *Actinia maculata* of Pennant, the second for a new animal procured on the west coast of Scotland during last summer. As the Actiniadæ conduct us very naturally from the Zoophytes to the Actinodermata, we should expect to find some two genera more closely linking the approaching families of each great order than the other genera composing these families; such seem to me to be found among the Zoophytes in *Lucernaria* and among the Actinodermata in *Vorticella*, which I regard as a pedunculated Actinodermatous animal. By the laws of analogy such an animal should exist, corresponding with the Crinoid Starfishes among the Echinodermata, which in like manner connect that order with the Zoophytes through the suborder Ascidioidea on the part of the latter.

As there can be but one analogy in the tribe of the importance assumed by *Lucernaria*, the other genera are representatives of minor groups, *Anthea* standing by itself as the typical genus of the Actiniadæ. *Actinia* we may regard as a soft *Caryophyllia*, *Iluanthos* as a soft *Turbinolia*, and *Adamsia* probably as an encrusting Zoophyte.

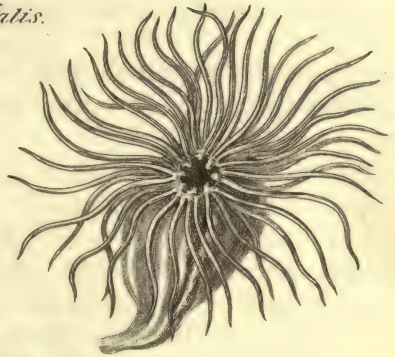
The points of generic character among the Actiniadæ appear to be, (1st,) the general form; (2nd,) the mode of attachment; and (3rd,) the arrangement and retractility of the tentacula.

The sources of primary specific character are in *Lucernaria*, (1st,) the mode of attachment; (2nd,) the number and arrangement of tentacula; and (3rd,) the presence or absence of intermediate marginal tubercles (eyes?).

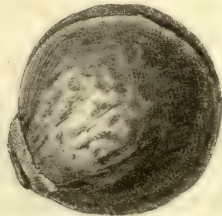
In *Anthea*, (1.) the characters of the body; (2.) the length; and (3.) the structure of the tentacula.



Actinea biserialis.



Iuanthus scoticus.



Snake Nut.



In *Actinia*, (1.) the arrangement of the tentacula; (2.) the structure of the oral disk; and (3.) the shape of the body.

As there is only one species as yet known of each of the genera *Adamsia* and *Iluanthos*, it is impossible to say certainly what are the points of specific character in those genera. Probably they will depend in the first on the tentacula and colouring; in the second on the tentacula and sulcature of the body. In assigning sources of specific character I have been guided by the analogies of the genera, taking it as a *probable law*, that the points of specific character correspond in animals at once analogous and allied, and that the points of specific character in the typical genus of a tribe are mainly characteristic of the tribe itself.

II. The genera of British Actiniadæ may be essentially characterized as follows:—

I. *ANTHEA* (Johnston). *Body* cylindrical, adhering by a broad *base*. *Tentacula* simple, non-retractile, surrounding the mouth.

II. *ACTINIA* (Linnæus). *Body* cylindrical, adhering by a broad *base*. *Tentacula* simple, retractile, surrounding the mouth.

III. *ADAMSIA* (Forbes). *Body* expanded, bilobed, adhering by a broad *base*. *Tentacula* subretractile, simple, surrounding the mouth.

IV. *ILUANTHOS* (Forbes). *Body* cylindrical, tapering to a point at its posterior extremity, free? *Tentacula* simple, retractile, surrounding the mouth.

V. *LUCERNARIA* (Muller). *Body* campanulate, adhering by a narrow *base*. *Tentacula* in tufts at regular distances on the oral margin.

As among zoophytes anatomical characters are of secondary generic, though of primary ordinal importance, I have not reckoned them essential. The two last genera may however be distinguished anatomically from the other three by their converging ovaries. This organization is the result, not the cause, of external form. In drawing up the above generic characters, I have borne in mind the existence of single Helianthoid Polypes wanting tentacula or with branched tentacula.

Of the former the genus *Discosoma* is an example; of the latter *Thalassianthos*, both inhabitants of the Red Sea, where they were discovered by Ruppell and Lauckart.

III. When in Guernsey in August last, I found a species of *Actinia* frequent among the rocks at low water in the island of Herm, which I have reason to consider undescribed. It was a cylindrical species, appearing as if pedunculated, from the narrowness of the lower part of the body, about one inch and a half high and one inch across the disk. The oral disk is surrounded by numerous tapering tentacula in two rows, the inner row consisting of sixteen long tentacula, three times as long as the outer, placed at some distance from each other: the outer forms a circle of numerous shorter tentacula, about a quarter of an inch in length. The colour of the body is dark brown with blue stripes, which bifurcate towards the base. The tentacula are paler, as also the disk, which is ornamented with bright blue stripes radiating from the mouth. This pretty species I propose to name *Actinia biserialis*, and characterize as follows:—

A. corpore elongato-cylindrico, brunneo, cæruleo-lineato; disco rotundo; tentaculis in duabus seriebus digestis, serie internâ longissimâ, externâ numerosissimâ.

This *Actinia* has no tubercles on the disk. The nature of such tubercles has not as yet been rightly investigated. *Actinia mesembryanthemum*, which generally has them, is sometimes without them, and so also with *Actinia viduata*; but wherever they are present in the latter species they are white, whilst in the former they are blue, an additional argument for the distinctness of the two species.

When dredging on the Manx coast in Sept. I took several specimens of *Actinia bellis**, a species which has been little noticed since Gaertner's time; and as doubts have been thrown on its specific identity, I add a note or two drawn from the living animal. The body is cylindrical, of a reddish or reddish white colour, regularly and finely striated longitudinally and transversely, and having glands of a bright yellow colour, small and not very numerous, scattered over the surface. At

* Of British authors, but not of Rupp.

the oral end the body bulges, forming a calyx, on which the furrows are fewer but more granulose. When the disk is expanded, this calyx laps back, and is then almost even with the expanded tentacula. Disk angular, in my specimens square, surrounded by three or four rows of short tentacula, thickly set, of a white or brownish colour, variegated, having generally a white line down the centre of each. The disk is broad, brownish or orange, with white lines. The margin of the mouth is bright orange. The animal can project its disk forward in a pouting manner. Tentacula and disk are retractile. The specimens described were about one inch long when expanded, but I have seen larger.

IV. The propriety of constituting a separate genus for the reception of the *Actinia maculata* of Adams must be evident to every one who has studied this beautiful family and has seen the species in question alive. The characters I have given above are sufficient for the genus; the species has been fully described before, both at home and abroad. On two points I have a remark to make. This year when dredging I paid particular attention to the alleged horny disk said to be secreted by the animal, and to the presence of the Hermit Crab, in the shells on which it is parasitical. Not a single specimen taken this season had either Hermit Crab or horny disk. That both such coincidences are common however may be seen by reference to a paper by Duges, "Sur une nouvelle espèce d'Actinie," in the 'Annales des Sciences Naturelles,' 2nde Série, Zoologie, vol. vi. p. 93. pl. 7. c., in which he describes this species, apparently unaware of its prior discovery. On the Manx coast in September last I found an unspotted variety. I have named the genus ADAMSIA after Mr. Adams, who first noticed it, and who contributed largely to the British Fauna in an age less favourable to natural history than the present; and for the species I have retained its original appellation of *maculata*, referring to it as synonyms the *Actinia carcincopados* of Otho, the *Actinia picta* of Risso, and the species described but not named by Duges.

V. Last summer, in company with Mr. Smith of Jordan Hill, we dredged up among *Corbulæ* and other inhabitants of mud, in four fathoms water, in Loch Ryan on the west coast

of Scotland, the remarkable zoophyte, for the reception of which I have constituted the genus *Iluanthos*. It is a free *Actinia*, about an inch and a half in length, the body large above, but tapering at its posterior extremity to a point. The mouth is round and rather small, surrounded by a circle of numerous long filiform tentacula, which are nearly equal in thickness throughout their lengths. The body is of a pink colour, with regular distant longitudinal white stripes: the tentacula are greenish, with a dark line down the middle of each*. It is probable the animal fixes itself in mud by means of its attenuated extremity, which I regard as analogous to the terminations of *Virgularia* and *Pennatula*. In its anatomy it differs not from other *Actiniae*, save that its ovaries converge. I propose to name the genus *Iluanthos*, from ἰλὺς, mud, and ἄνθος, a flower; and the species *Iluanthos Scoticus*.

REFERENCE TO PLATE III.

Actinia biserialis, and *Iluanthos Scoticus*.

XXI.—*A short Outline of a Fauna for Part of Herefordshire.* By R. M. LINGWOOD, Esq., F.L.S.

THE district included in the following list lies S.E. of the town of Hereford, and is exceedingly interesting in a geological point of view, as it comprises the Townhope Valley of Mr. Murchison's Silurian Regions; and the remainder is the Old Red Sandstone; it is about ten miles long from N.E. to S.W., and six broad from N.W. to S.E. I have thought that a list of the animals and birds might not be unacceptable to some of your readers. I have followed the nomenclature of Jenyns's British Vertebrata.

MAMMALIA.

Meles Taxus. (Badger.) Not uncommon.

Mustela Putorius. (Polecat.) Common.

——— *vulgaris*. (Weasel.) Common.

——— *Erminea*. (Stoat.) Common. I have a specimen shot in February of this year, quite white except the back of the head and the tip of the tail.

* Resembling very nearly the tentacula of Rupp's *Actinia filiformis*.

Lutra vulgaris. (Otter.) One or two generally frequent the river Lug.

Canis Vulpes. (Fox.) Common.

Talpa Europæa. (Mole.) Common.

Sorex Araneus. (Common Shrew.) Common.

—— *fodiens*. (Water Shrew.) Meadows by river Lug.

Erinaceus Europæus. (Hedgehog.) Not very general.

Rhinolophus Hipposideros. (Lesser Horse-shoe Bat.) Over the kitchens at Sufton Court.

Vespertilio Noctula. (Noctule.) Found 47 individuals in a hole in an ash tree.

Vespertilio Pipistrellus. (Pipistrelle.)

—— *auritus*. (Long-eared Bat.)

Sciurus vulgaris. (Squirrel.) Very plentiful.

Myoxus avellanarius. (Dormouse.) Not general.

Mus sylvaticus. (Field Mouse.) Common.

—— *Musculus*. (House Mouse.) Common.

—— *decumanus*. (Brown Rat.) Common.

Arvicola agrestis. (Field Campagnol.) Very numerous.

—— *riparia*. (Bank Campagnol ?) I am unable to insert this species for certainty, as only one specimen has come under my observation, and that in a damaged state.

—— *amphibia*. (Water Rat.) Common.

Lepus timidus. (Hare.) May 27th 1839. My attention was attracted by a hare carrying something in her mouth, and upon concealing myself she passed within two or three yards of me, and I distinctly saw she was carrying a leveret a week old: her purpose seemed concealment, as she took it into some thick fern, and I saw no more of her.

—— *Cuniculus*. (Rabbit.) Common. A black var. is not uncommon, and occasionally a yellow var. is seen.

AVES.

Falco Tinnunculus. (Kestrel.) Common.

Accipiter fringillarius. (Sparrow Hawk.)

Milvus Ictinus. (Kite ?) Only inserted on the authority of my gamekeeper.

Buteo vulgaris. (Common Buzzard.)

Otus Brachyotos. (Short-eared Owl.) A single bird killed Nov. 1839.

Strix flammea. (White Owl.) Common.

Syrnium Aluco. (Tawny Owl.)

Ann. Nat. Hist. Vol. 5. No. 30. May 1840.

- Lanius Collurio.* (Red-backed Shrike.) Not common.
Muscicapa luctuosa. (Pied Flycatcher.) A pair shot June 1839.
Turdus viscivorus. (Missel Thrush.)
 ——— *pilaris.* (Fieldfare.) Common in winter.
 ——— *musicus.* (Song Thrush.) Common.
 ——— *iliacus.* (Redwing.) Common in winter.
 ——— *Merula.* (Blackbird.) Common.
Accentor modularis. (Hedge Accentor.) Common.
Sylvia Rubecula. (Redbreast.) Common.
 ——— *Luscinia.* (Nightingale.) Not common.
 ——— *Atricapilla.* (Blackcap.)
 ——— *cinerea.* (Whitethroat.) Common.
 ——— *sibilatrix.* (Wood Wren.) Common.
 ——— *Trochilus?* (Willow Wren.)
 ——— *Hippolais.* (Chiffchaff.) Common.
Regulus aurocapillus. (Gold-crested Regulus.)
 ——— *ignicapillus.* (Fire-crested Regulus.) The latter appears
 the more plentiful species.
Motacilla alba. (Pied Wagtail.) Common.
 ——— *Boarula.* (Gray Wagtail.)
 ——— *flava.* (Yellow Wagtail.) Not common.
Parus major. (Great Titmouse.) Common.
 ——— *cæruleus.* (Blue Titmouse.) Common.
 ——— *palustris.* (Marsh Titmouse.) Common.
 ——— *ater.* (Cole Titmouse.)
 ——— *caudatus.* (Long-tailed Titmouse.) Common.
Alauda arvensis. (Skylark.) Common.
 ——— *arborea.* (Wood Lark.) Common.
Emberiza Schæniculus. (Reed Bunting.) Common.
 ——— *Citrinella.* (Yellow Bunting.)
Fringilla Cælebs. (Chaffinch.) Common.
 ——— *domestica.* (House Sparrow.) Common.
 ——— *Chloris.* (Green Grosbeak.)
 ——— *Carduelis.* (Goldfinch.) Common.
 ——— *cannabina.* (Common Linnet.)
Pyrrhula vulgaris. (Bullfinch.) Common.
Sturnus vulgaris. (Starling.) Common.
Corvus Corax. (Raven.) Breeds in Stoke Park.
 ——— *Corone.* (Crow.) Common.
 ——— *frugilegus.* (Rook.) Common.
 ——— *Monedula.* (Jackdaw.)
 ——— *Pica.* (Magpie.) Common.

Garrulus glandarius. (Jay.) Common.
Picus viridis. (Green Woodpecker.) Common.
Yunx Torquilla. (Wryneck.)
Certhia familiaris. (Common Creeper.) Common.
Troglodytes Europæus. (Common Wren.) Common.
Sitta Europæa. (Nuthatch.) Common.
Cuculus canorus. (Cuckoo.) Heard 22nd April 1839, for the first time.

Hirundo rustica. (Swallow.) Common.
 ——— *urbica.* (Marten.) Common.
 ——— *riparia.* (Bank Marten.) Common.
Cypselus Apus. (Common Swift.) Common.
Caprimulgus Europæus. (Goatsucker.) Not common.
Columba Palumbus. (Ringdove.) Common : breeds in great numbers.
 ——— *Ænas.* (Stockdove.) Found a nest in a hollow tree May 1839.

——— *Turtur.* Not common.
Phasianus colchicus. (Common Pheasant.)
 ——— *torquatus.* (Ring-necked Pheasant.) And all intermediate varieties.

Perdix cinerea. (Common Partridge.)
Vanellus cristatus. (Lapwing.) Not common.
Ardea cinerea. (Heron.)
Scolopax Rusticola. (Woodcock.)
 ——— *Gallinago.* (Snipe.)
 ——— *Gallinula.* (Jack Snipe.)
Crex pratensis. (Corncrake.) Common.
Gallinula chloropus. (Common Gallinule.) Common.
Anas Boschas. (Mallard.)
 ——— *Crecca.* (Teal.)
Mareca Penelope. (Widgeon.)

REPTILIA.

Lacerta agilis. (Common Lizard.) Not general.
Anguis fragilis. (Blind-worm.) Common.
Natrix torquata. (Snake.) Not common.
Vipera communis. (Common Viper.) I killed one in Oct. 1839, measuring 34 inches in length.

AMPHIBIA.

Rana temporaria. (Frog.)
Bufo vulgaris. (Toad.)

Triton palustris. (Warty Eft.)— *punctatus*. (Common Eft.)

PISCES.

Perca fluviatilis. (Perch.)*Cottus Gobio*. (Bullhead.)*Cyprinus Carpio*. (Common Carp.)— *Gobio*. (Gudgeon.)— *Tinca*. (Tench.)— *Rutilus*. (Roach.)— *Leuciscus*. (Dace.)— *Cephalus*. (Chub.)— *Phoxinus*. (Minnow.)*Cobitis barbatula*. (Bearded Loach.)*Esox Lucius*. (Pike.)*Salmo Salar*. (Common Salmon.)— *Fario*. (Common Trout.)*Thymallus vulgaris*. (Grayling.)*Platessa Flesus*. (Flounder.) A single specimen caught with rod and line Dec. 1839, in river Lug, below Mordiford Bridge.*Anguilla acutirostris*. (Sharp-nosed Eel.) } In river Lug.— *latirostris*. (Broad-nosed Eel.) }XXII.—*Monograph of the Dorylidæ, a Family of the Hymenoptera Heterogyna*. By W. E. SHUCKARD, Esq.

THE discovery of an insect that will, I expect, help to clear up the difficulty which has hitherto attended the completion of these genera, as yet consisting of males only, has induced me to undertake the present monograph. Although the materials with which I entered upon this task were rather scanty, they have grown upon my hands and are now coextensive with the metropolitan collections; and when we know that these comprise the collections of many individuals, all much attached to the order Hymenoptera, we must conclude that these genera are naturally poor in individuals, although the number of species that I produce far exceed all that have been hitherto described. In the genus *Dorylus* three species only have yet been noticed, two African and one Indian, but it is very questionable if one of the African species may not, understood under the name of *D. helvolus*, consist of many species from that quarter of the globe which constitute the majority of the family, for Africa is evidently

its metropolis. Our present knowledge of the range of the genus *Labidus* is of much more limited extent : it has hitherto been found only in the intertropical portion of the New World. As confusion attends the nomenclature of the species hitherto recorded, and wherein evidently several have been included, it will perhaps repay the trouble of investigation to subject them to a critical examination, for thus only will it be possible to extricate them from the disorder into which they have fallen. This has, I have no doubt, arisen from their great rarity, as probably not more than a single specimen, or perhaps specimens of a single species, have been at the time in the possession of either of the several describers, who have all attributed it to that originally published, never more than doubtfully surmising the possible existence of any but that one species ; and so fully pre-occupied must they have been with this idea, otherwise the disparity of the descriptions would have evinced at once that they belonged to different insects.

The situation which these genera occupy in the system, and their right to form a separate family, has been latterly subjected to discussion by very competent individuals—le Comte de St. Fargeau in France, and Mr. Haliday in our own country, who both seem disposed to unite them permanently with the social Heterogyna or Ants, and these views they have supported by many arguments. It is however only latterly that they have been separated from the Mutillidæ, and by these same gentlemen, although less definitely and distinctly by St. Fargeau, who calls them Genera provisionally approximated to the Heterogyna *. But Mr. Haliday has first raised them to a family equivalent to the whole of the social Ants, and which with them constitute his tribe Heterogyna†, and he at the

* It is by this author in the same work, ‘ Hist. Nat. des Insect.’ Hymen. (and in which he is followed by Mr. Haliday), that the term Heterogyna was restricted exclusively to the Social Ants. Latreille comprised within it the *Mutillidæ* also, and it thus consequently embraced all the aculeate Hymenoptera with apterous females. If the distribution thus introduced is to hold, and they are to be subdivided, and each division to be considered equivalent to the other tribes, the name *Heterogyna* ought to remain with what we now understand by the *Mutillidæ*, as it is only these that have anomalous females, this sex in the tribe of Ants, as far as they are yet known, being all winged like their males ; the term therefore in application to them is very inappropriate, unless in reference to other sexual discrepancies, and then it could be as legitimately applied to many other Hymenoptera. I shall have occasion shortly to go more particularly into this subject, and shall then discuss the propriety of the present contents and distribution of the whole of Latreille’s Heterogyna and the neighbouring groups.

† Dr. Leach had previously formed them into a family by the name *Dorylidæ*, which he incorporated with the tribe *Mutillarides*, and he made them equivalent to the whole of the remainder of the *Mutillidæ*.

same time makes the whole of Latreille's *Diploptera* intervene between them and the *Mutillidæ*. I am prepared with Mr. Haliday to consider them as constituting a family, but certainly not to be united at present with the Ants, nor yet can they be incorporated with the tribe *Mutillidæ*, miscalled a family, which distinctly contains several natural families, but they are a connecting link between the two. In favour of my opinion of their being as intimately allied to the *Mutillidæ* as to the Ants, I may in the first place adduce the *argumentum ad verecundiam*,—the opinions of some celebrated entomologists,—of Linnæus, Fabricius, and Latreille. It is true, Linnæus first placed the insect, which for several years singly constituted the genus *Dorylus*, in the genus *Vespa**, but he immediately afterwards transferred it to *Mutilla*†, with this note however—"Singularis species, forte hujus generis." The first time that Fabricius notices it is in his *Mantissa*‡, for he does not mention it in his two preceding works, and there he says, "Hujus generis videtur, quamvis habitus differt, nondum rite examinata. Potius forte ad *Tiphias* pertinet:" and in his next work, the *Entomol. Systemat.*, he constructs for it the genus *Dorylus*, and very truly says, "Genus singulare, instrumentis cibariis, mandibulis exceptis, minutissimis, attamen distinctis:" and he here places the genus between the last of his genera of Ants and the genus *Mutilla*, and subsequently made no alteration in it except by the addition of two species, the claims of which will be examined below. Latreille invariably throughout all his works placed it with the *Mutillidæ*, and we may conclude from this that his views never vacillated regarding its position; for although his works present a gradual and progressive alteration as to the grouping of insects—not always for the better—yet in this instance he was uniformly the same; and swayed doubtlessly by his observation in his 'Genera Crustaceor. §,' where he says of the two genera, of which he had there formed a distinct section of the family, "*Labidorum* et *Dorylorum* œconomia latet, et masculi tantum noti; feminae forsan apterae et solitariae degentes. Si, ut fornicariae, societates inirent, frequentius quam masculi colligerentur." But he here places them in close approximation to the genus *Formica*. Jurine, although the founder of the genus *Labidus*, can scarcely be adduced as an authority for systematic distribution; yet he also places them in close approach to the Ants, but before *Cynips*, and puts the genus *Labidus* in juxtaposition with *Dorylus*, of which no doubt was ever enter-

* Museum, Ludov. Ulric. Regin. p. 412.

† System. Nat. ii. 967. ‡ Tom. i. p. 313. 18. 1787.

§ Genera Crust. et Insect. p. 124. Annotatio.

tained except by St. Fargeau*, although he says apparent analogy induces him to leave them together. To me however it is evident that, with the exception of the small difference in the neururation of the wings, the genera are very much alike, and this affinity is still further proved by means of the new genus I describe below by the name of *Ænictus ambiguus*, which deprived of its wings might easily pass for a *Labidus*, it having the same kind of canaliculated peduncle to the abdomen, and legs like the latter, for neither femora nor tibiæ are compressed as in the typical *Doryli*.

In reviewing the arguments urged by St. Fargeau for placing these genera with the Social Ants in opposition to the views of Latreille, I cannot think that founded upon the structure and relative proportions of the antennæ of any value at all, as in the several species of each of these genera the structure and proportions of these organs differ considerably; and besides this, in very many of the males of the Social Ants, indeed, I may say in the majority of them, the scape or first joint of the antenna is not one-third of the length of the entire organ. In the structure of the mandibles, which he also cites in support of his opinion, there are, especially in the genus *Dorylus*, considerable differences in the species, and nothing can be more fallacious than to suppose that the structure of these organs in the genus *Dorylus* can possibly indicate ædificatorial habits; for they are edentate, forcipate, and considerably slighter in proportion than the male mandibles in the great majority of the genera of the well-known solitary Heterogyna: and his argument from the structure of the wing is not so strong as he might have made it if he had adduced the single recurrent nervure, which is a structure never found in the normal solitary Heterogyna, for they have invariably two recurrent nervures†. I admit that the mere absence of the females proves nothing as to the solitary habits of these genera, although I think with Latreille as above cited, that the presumption is in favour of their being so.

In confirmation of St. Fargeau's views, Mr. Haliday, as I observed above, has formed these two genera into a family, and has placed them in the same tribe with the Social Heterogyna, making them equivalent to the whole of this tribe; and in corroboration of St. Fargeau, he says, "*Dorylidas societate victuros more Formicarum contendit Peletierus argumentis equidem gravissimis, quibus adjicienda*

* Hist. des Hymenopt. vol. i. p. 227.

† Certainly with the exception of the genus *Apterogyna*, which is another anomalous form, and which seems to be also another connecting link at a different point with the Social Heterogyna.

videntur—squamularum defectus, (alas alterius sexus caducas innuens) et mesothorax spiraculum insigne, a structura Mutillarum aliena." Having above shown that these supposed weighty arguments of St. Fargeau are not valid, I think their corroboration must fall with them; for both of these genera have very distinct squamulæ (or tegulæ); and the mesothoracic spiracle is also conspicuous in many of the *Mutillidæ*, particularly so in the few smooth and glabrous *females* of the genus *Mutilla* itself.

If it had been possible consistently to overrule the plausibility of these being solitary insects from our previous ignorance of any that might have been appropriately assigned to them as females, the majority of the few arguments which I shall adduce in favour of their constituting a separate family, and to intervene between the Social Ants and the *Mutillidæ*, would have helped to strengthen the supposed connexion with the social tribes, which however I admit to be only a very close affinity. They are these: 1st. The before-mentioned solitary recurrent nervure to the wings; 2nd. The single calcar to all the tibiæ; 3rd. The labrum closely shutting the oral orifice and inclosing all the internal trophi; 4th. The curtailed structure of the palpi; and 5th. The enormous size of the male genital organ.

The first two circumstances evidently separate them from the *Mutillidæ*, which in all instances have two calcaria to the four posterior legs, and two recurrent nervures to the superior wings, with the solitary exception before noticed; but it is necessary to observe that in *Dorylus* the insertion of the recurrent nervure is considerably further in advance towards the second submarginal cell than it ever occurs in any of the Social Heterogyna that have but two submarginal cells. The closing of the labrum is found frequently amongst the Social Ants, but it also occurs in the Solitary Heterogyna in the female *Thynnidæ*: the fourth instance peculiarly separates them from both tribes; but in the fifth, the structure of the male organ, they exclusively resemble several of the Solitary Heterogyna, for this is evidently both in form and size a prehensile organ, and we know that it is used as such in the males of several of the genera of these solitary insects who thus seize and carry off their females; and W. S. MacLeay, Esq. has recently informed me in a letter from Sydney, New South Wales, that this is universally the case in the New Holland *Thynnidæ*, and we consequently find, where this is the case, that the male is much the largest insect. This last observation is not limited to these families, for it is confirmed in the genera *Anthidium* and *Anthophora*, amongst the Bees, both of which carry off their fe-

males and are always larger than that sex. In the Ants however the males are, as far as I correctly know them, invariably smaller and frequently disproportionately so to their partners, consequently this analogy is strongly in favour of the connexion of these genera with the *Mutillidæ*, although three of the preceding speak for their union to the social Ants. I think therefore that this combination and the peculiarity incident to themselves only in the structure of their palpi warrant me in the present state of our knowledge to consider them an osculant tribe intervening between these two, and as such I shall view them.

With respect to their habits of life I have nothing positive to state; I will however hazard the hypothesis that they are parasitical. The Ants and the *Staphylini* have been supposed to represent each other in the tropical and temperate zones. In the temperate zone, and especially in our own country, the *Staphylini* are a dominant group, and the ants a secondary one. The reverse is the case within the tropics, and the lines immediately adjacent within a few degrees north and south. In our own country and throughout Europe we find several species of this northern dominant group parasitical in the nests of Ants; and, *cæteris paribus*, why may there not be, where the Ants themselves are the dominant group, an analogous instance of a genus closely allied to the Ants parasitical upon them? For the genus *Bombus* is another dominant northern group which has a parasite—the genus *Psithyrus*—so like it, that they were not until latterly separated from it, although sufficiently distinct; and in this genus *Psithyrus* the males greatly predominate in number. Now if I can show that the two genera *Dorylus* and *Labidus* are considerably alike, and in many points analogous to the genus *Ponera* among the Ants, which although not exclusively a tropical form, yet chiefly so,—which however strays into Europe and as far north as England, but it is most fully developed in Africa and South America, and another form of it wanders into New Holland*,—I think it will be admitted that there is some plausibility in the supposition that these extraordinary genera may possibly be parasites upon the Social Ants; and when it is further seen that the female, which I surmise may belong to the genus *Labidus*, is both apterous and blind, it becomes further probable that she may seldom quit the nest where she is a parasite; and this will in a great measure account for specimens of this sex rarely coming to Europe, as it is not to be sup-

* There are three distinct types in the genus *Ponera*, which ought to form so many sections, and these seem to follow countries, viz. northern, southern and tropical.

posed that disturbing a nest of Ants for the sake of examining its contents, even if it have ever been thought of within the tropics, is there the same slight matter that it is here, and that it may be executed with the same impunity. The colonies of these insects in hot climates are very populous, and their sting much more venomous than here, the poison increasing in intensity with the degree of heat; besides which, the collectors in those climates are either natives or negroes, who would be contented with what chance might throw in their way, without exposing themselves to the possibility of a conflict with such redoubtable opponents as a colony of Ants.

I am prepared, in pursuit of the above conjecture, to show a considerable degree of resemblance, as I said just now, in many points of *analogy* between *Ponera* and the *Dorylidæ*. I possess a male of the former from Western Africa, which in its minute head, large ocelli, elongate cylindrical body, and node of the abdomen, very much resembles a *Dorylus*, and in the neuration of its wings it is a close approximation to *Labidus*; but notwithstanding these particulars it is but an analogy, for the trophi are totally dissimilar, and there it is a genuine Ant. I have just now stated the female which I have so often alluded to is blind, and this is the case in the species of *Ponera* that occurs in this country, the only European species of the genus; and besides which this remarkable little female has three minute spines at the apex of the abdomen, a character found in the *Ponera crassinoda* from Demerara, but which occurs, as far as I have had the opportunity of examining, in no other *female* of any hymenopterous genus. In *Labidus* also the calcar of the four posterior legs is dilated at its base and acuminate at the apex, a character found in one of each of the calcaria of the four posterior legs of *Ponera*; these I consider all strong analogical circumstances. In conclusion I would observe that I think it extremely probable that these females are of very voracious habits, for the perfect one I possess has within its mandibles a portion of the wing of apparently a *Termes**; and the second species, of which I have only the head, is attached by the mandible to the thigh of a large *Formica*, an insect six times its size. I willingly allow that an important portion of the whole of this argument wants direct confirmation as far as regards what I consider may be the female *Labidus*, for although the points of resemblance which I shall below show are many and strong, yet are they only conjectural: but how shall it be proved or disproved,

* I once thought it possible that they might be parasitical upon this genus, but I speedily discarded this idea as merely a vague hypothesis.

unless by actual observation, that it does or does not belong to this genus, and what its sex may be—and when may we hope for this ?

In the absence of such direct testimony, and of any insect that may be more consistently united with this little female as its legitimate partner, I shall not hesitate continuing to consider my conjecture of their identity as correct, particularly as it seems confirmed by the structure of the palpi in all.

I shall here therefore terminate these general observations, and proceed with the Monograph, premising that I have found it necessary throughout to give ample specific descriptions to prevent the possibility of mistake. I consider the position of the family in the system will stand thus :

HETEROGYNA, LATR.

SOCIALES, *Latr.*

Formicidæ, &c.

PARASITICÆ? *Shuck.*

Dorylidæ, *Halid.*

SOLITARIE, *Latr.*

Mutillidæ, &c. &c.

Family DORYLIDÆ, *Haliday.*

DORYLIDA, *Leach.**

CHAR. *Head* transverse, small.

Eyes and *ocelli* large and prominent.

Antennæ setaceous, not geniculated.

Mandibles edentate, forcipate.

Body elongate, cylindrical; superior wings with two or three submarginal cells and one or two recurrent nervures: one calcar to all the tibiæ.

Abdomen with the basal segment usually smaller than the following, from which it is separated by a deep incision.

Table of the Genera.

One recurrent nervure :

Three submarginal cells 1. LABIDUS, *Jurine.*

Two submarginal cells

Femora cylindrical 2. ÆNICTUS, *Shuck.*

Femora compressed 3. DORYLUS, *Fab.*

Two recurrent nervures 4. RHOGMUS, *Shuck.*

I have arranged the family according to what I consider their most

* In Brewster's Encyclop. Art. Entomology.

proximate affinities. Thus *Rhogmus* by its two recurrent nervures leads off to the *Mutillidæ*, and from general habit *Dorylus* closely approaches it: between the latter and *Labidus* intervenes *Ænictus*, which participates in the characters of both; whilst finally, taking them inversely, *Labidus* distinctly points towards *Ponera* amongst the Social Heterogyna.

Genus 1. LABIDUS, *Jurine*.

DORYLUS, *Fab.* partly?

CHAR. *Body* elongate, cylindrical.

Head small, short, transverse, flat.

Antennæ varying in length, usually setaceous, curved and inserted within two facial projections (forming vertical carinæ) upon the anterior margin of the nearly obsolete clypeus, the scape never more than one-fourth the length of the flagellum, the apex of which frequently extends as far back as the insertion of the superior wings.

Eyes large, lateral, subglobose, and very prominent.

Ocelli large and very prominent, and placed in a curve upon the vertex.

Mandibles elongate, slender, arcuate, and forcipate, always leaving an open space usually semicircular between them and the clypeus.

Labrum triangular, the apex rounded, and in repose shutting down upon and inclosing the internal trophi.

Maxillæ ———?

Maxillary palpi two-jointed, shorter than the labial? *

Labial palpi two-jointed, slender, the basal joint the longest.

Labium triangular.

Thorax ovate, gibbous: *prothorax* extending laterally to the insertion of the wings, which is at about half the length of the thorax: *scutellum* transverse: *metathorax* perpendicular and abruptly truncated.

Superior wings usually as long or longer than the abdomen, rarely shorter,

* Latreille throughout all his works says the "maxillary palpi are at least as long as the labial, and consist of four or at least three joints." (*Palpi maxillares labialium saltem longitudine, articulis quatuor aut ad minimum tribus.*—*Genera Crustac. et Insect.*, iv. 123.) except in his portion of the 'Règne Animal' of Cuvier, where he says, vol. v. p. 315, that they consist of at least four joints: but he here further says of this genus, that the mandibles are shorter and less slender than in *Dorylus*; the reverse of which is the case. Now all this implies very unsatisfactory uncertainty, and I am therefore disposed to consider that Jurine is correct, and that the palpi are constructed as stated in the text. I have unfortunately not had the opportunity of dissecting a specimen, as only single specimens of any species are extant in any collection, and the extreme minuteness of the parts would involve the certain destruction of the head: from the same cause I have been unable to examine the male sexual organ, and to compare it with those of the other genera; but this is the less necessary here, as the genus is otherwise very obviously distinguishable from the rest.

with one marginal and three submarginal cells, which vary in form in the species, and one recurrent nervure, which is inserted about the middle of the second submarginal cell *.

Legs varying in length in the species: *coxæ* large, not deeply excavated above: *trochanters* small, triangular: *femora* and *tibiæ* cylindrical, all the latter with a single calcar at their apex, which is usually dilated at the base: *tarsi* long and slender, the basal joint the most robust and the longest, the remainder decreasing in length, excepting the terminal one, which is a little longer than the penultimate: *claws* armed with a minute tooth just within the apex, and furnished with a small pulvillus within their fork.

Abdomen cylindrical, slightly curved, the segments frequently slightly constricted, the basal one forming a variously constructed peduncle, occasionally either flat or concave above, but most frequently transversely convex, and always separated from the following by a deep incisure. Penultimate and antepenultimate segments subequal, and the terminal one strictly compressed vertically at its apex, where it is profoundly emarginate.—The male sexual organ usually protruding in the form of a deeply canaliculated and emarginated plate or two acuminate compressed and curved spines †.

Type of the genus, *LABIDUS Latreillii*, Jurine.

As far as yet discovered, the insects of this genus are all from the New World, and I believe inter- or subtropical. Their habits have not been observed, nor have their females been yet detected with certainty, although it is perhaps probable that the insects I describe below as such may be so; at all events they have a decidedly close affinity to the present genus. The arguments whereby I support this view will be exhibited in connexion with the insects themselves. Although three species of this genus have been described, they have been attributed to the same, but that they are not identical will be shown in the synonymy. As the first species was described by a patronymic, I have followed this example, and have dedicated them all to individuals distinguished for their attachment to the Hymenoptera.

* The larger relative proportions of the wings in this genus is shown by a comparison of their expansion with the length of the insect; I have therefore always given both these admeasurements.

† The form of this organ I regret I cannot examine, for the sake of comparison with those of the other genera of this remarkable family. It must necessarily very much differ from the others, even more than they do *inter se*, from the peculiar structure of the apex of the terminal segment; but I suspect it would most resemble that of *Rhogmus*, with which the genus agrees in the vertical incision of the dorsal portion of the terminal segment.

* *Peduncle subtriangular and concave above.*

Sp. 1. Lab. *Fargeavii*, *Shuck.*

Length 14 lines.

Rufo-fusco-hirtus, capite thoraceque et femoribus nigris, cætera rufo-fuscus, abdomine suprâ rufo-sericeo.

Labidus Latreillii, *St. Fargeau*, Hist. Nat. des Hymenop. (Suites à Buffon), tom. i. p. 229. i.

"Head and antennæ black. Mandibles brown black. Thorax black: metathorax prolonged in the centre of its sides into an obtuse point. Abdomen, legs, and tarsi reddish brown. First segment of the abdomen furrowed longitudinally above; its sides raised into a carina which terminates posteriorly in a point. The whole insect enveloped in long reddish upright hair, excepting the back of the 2—5 and base of the sixth segments of the abdomen, but which are covered with a close decumbent reddish silky down. Femora blackish. Wings of a reddish yellow."

I have not seen the preceding insect, but a comparison of its description, which is verbally translated above, with the next but one, which is the genuine *Lab. Latreillii*, will distinctly show that they must be different, and that the present one was incorrectly attributed. I have consequently given it the name of its distinguished describer. It is apparently the largest in the genus.

Sp. 2. Lab. *Jurinii*, *Shuck.*

Length 10½ lines;

Expansion 20 lines.

Rufo-testaceus, pubescens: capite (mandibulis antennisque exceptis) nigro; pedunculo abdominis subtrigono, supra valde concavo; pedibus longissimis.

Entirely of a reddish testaceous, excepting the vertex and the face, which are black. It is throughout pubescent, excepting the metathorax and the surface of the peduncle. The antennæ are long, setaceous, and curved; the scape robust, and about one-fourth the length of these organs, which are inserted about the middle of the clypeus, within two deep cavities internally acutely carinated, and these carinæ, which ascend the face, abruptly truncated at about one-third the length of the scape: ocelli placed in an equilateral triangle on the vertex: mandibles very long and much arched, leaving a nearly circular space between them and the clypeus.

Thorax having the scutellum moderately large and prominent, not very gibbous: metathorax smooth and shining, nearly perpendicular: superior wings with their marginal cell lanceolate; the first submarginal pentagonal, and larger than the second, from which it is separated by a waved transverso-cubital; the second transverso-cubital straight and directly transverse; the recurrent nervure inserted at about one-third the length of the second submarginal: legs long, the posterior pair extending as

far as the apex of the abdomen: the basal joint of the posterior tarsi very robust.

Abdomen opaque, curved downwards, the segments not constricted: the peduncle subtrigonal, narrower than the following, rounded at the base, concave and shining above, the posterior angles produced, and the ventral portion smooth and not produced; the terminal segment vertically but not acutely compressed at its extreme apex, where it is deeply emarginate.

In my own cabinet.

This species is from Demerara I believe. The difference of size prevents my considering it the type, which is the next; this, although not a conclusive point in the majority of insects, I think may by analogy be considered so here, for in the genus *Dorylus*, in which I have had the opportunity of examining many individuals of several species, there is none or but a very immaterial difference in their size. In the present genus I have seen but single specimens of any species. To judge from the description, the distribution of colour, and the structure, are apparently the same, excepting that in the next the neuration of the wings is brown, whereas in this they are of the same colour as the body.

Sp. 3. Lab. Latreillii, Jurine.

Length 8 lines.

Rufo-testaceus, pubescens: capite (mandibulis, antennisque exceptis) nigricante; pedunculo abdominis subtrigono, supra in medio plano, ad latera elevato; nervis alarum brunneis.

Jurine, Nouv. Method. Hymenop., p. 282.

Latreille, Genera Crustac. et Insect. iv. 123.

——— Nouv. Dict. d'Hist. Nat., 2^e éd. tom. xvii. 141.

“Body reddish, pubescent. Head blackish, excepting the antennæ and mandibles, which are of the same colour as the body. Ocelli are placed in a triangle on the vertex: the superior wings are of a bright fulvous tint, and the nervures brown; their marginal cell is oval and elongate; the first submarginal is nearly square, the second is smaller and receives the recurrent nervure: the tibiæ increase in thickness to their extremity, and the calcar at their apex is broad at the base, as is also the basal joint of the tarsi.

“The abdomen is elongate and curved at its apex; the peduncle has the form of a saddle, the sides being raised.”

This insect Latreille says is from Cayenne. I have not seen the species, consequently his description given in the second edition of the ‘Nouveau Dictionnaire d’Hist. Nat.’ is here repeated. It is very probable that he received it from M. Jurine, who dedicated the species to him. Others have frequently been mistaken for it, but I think its size and other peculiarities sufficiently distinguish it

from any that I know. It is remarkable that this genus should have suffered neglect so long as to have had but one species distinctly recorded.

** Peduncle more or less convex.

† Transverse-quadrate.

Sp. 4. *Lab. Halidaii*, Shuck.

Length 7 lines;

Expansion $14\frac{1}{2}$ lines.

Rufo-testaceus, pubescens: capite (clypeo, mandibulis antennisque exceptis) nigro; stigma alarum brunnea: et abdominis pedunculo transverso-quadrate, supra in medio convexo.

Lab. Latreillii, Haliday. Linn. Trans., vol. xvii. p. 328.

Body reddish testaceous, pubescent, especially about the coxæ, beneath the peduncle, and towards the apex of the abdomen. Head black, excepting the clypeus, mandibles and antennæ, which are of the same colour as the body; the latter are inserted nearer the middle of the face than usual, the carinæ behind which they are inserted terminating abruptly near the anterior ocellus. The ocelli placed in a curve upon the vertex; the scape not much more than one-sixth the length of the whole antennæ: the mandibles small, leaving but a small aperture between them and the clypeus.

Thorax very gibbous in front, as also at the scutellum: metathorax abruptly perpendicular, slightly produced laterally: superior wings with their stigma brown, marginal cell lanceolate, slightly acuminate from the apex of the second submarginal, and scarcely larger than either of the two first submarginals, which are also nearly equal in size: the first transverso-cubital nervure straight, and the second cubital cell receiving the recurrent nervure at about one half of its length, beyond which the cubital nervure becomes a little thickened: legs short and very slender.

Abdomen very shining: its first segment transverse-quadrate, and a little wider than the second, the posterior angles truncated, and with a small convex elevation in the centre of its superior surface, its ventral portion scarcely produced; the third and fourth segments slightly constricted at their base, and the terminal one acutely vertically compressed at its apex, where it has a deep fissure; and the sexual organ protruding beneath in the form of a slightly convex plate, deeply emarginate, with the lateral processes very acute.

In the collection of Capt. King, R.N. and Mr. Curtis.

This insect is from St. Paul, on the Brazilian coast. It is the specimen examined by Mr. Haliday, and considered as the *Labidus Latreillii* in his description of Capt. King's insects; but that it is not this insect, a comparison of its description with the preceding will amply show. I have accordingly dedicated it to Mr. Haliday. In the observations on the next species I shall mark its differences from that.

Sp. 5. Lab. Swainsonii, Shuck.

Length $6\frac{1}{2}$ lines;

Expansion 13 lines.

Rufo-testaceus, pubescens, capite (mandibulis antennisque exceptis) castaneo: pedunculo abdominis transverso-quadrato supra subconvexo; pedibus brevis.

Body of a pale reddish testaceous. Head, with the exception of the mandibles and antennæ, of a bright castaneous; the carinæ of the face, behind which the antennæ are inserted, very prominent, and terminating gradually in front of the anterior ocellus; the ocelli placed in a curved line on the vertex: the antennæ having the flagellum at the base, as stout as the scape, which is a little less than one-fourth the length of the organ: mandibles long and very slender, leaving a large semicircular space between them and the clypeus.

Thorax in front and scutellum very gibbous: metathorax perpendicular and slightly produced laterally: superior wings with their nervures and stigma pale testaceous: the marginal cell lanceolate, slightly acuminate beyond the second submarginal, the first of the latter narrow, pentagonal, less than the second, from which it is separated by a waved nervure: the second also narrow, but growing more so towards its apex, where it is separated by a short straight nervure from the following; it is much less than the marginal cell, and has the recurrent nervure inserted about its middle, beyond which to the apex of this cell the cubital nervure is considerably thickened: legs short and slender.

Abdomen slightly shining, its peduncle transverse-quadrate, with the angles rounded, the surface plane, except towards its apex, where it has a slight convex transverse ridge, and is as wide as the second segment, its ventral portion slightly produced; the base of all the segments very slightly constricted, and the extreme apex of the terminal one considerably compressed vertically, where it has a deep fissure: the male sexual organ protruding beneath, in the form of a deeply and concavely emarginated plate, the lateral processes of which form acutely acuminate slightly upcurved spines.

In my own collection.

This insect was captured by Mr. Swainson in the Brazils, to whose entomological exertions there we are indebted for the knowledge of several undescribed species, and this I accordingly dedicate to him. It is distinguished from the preceding by many particulars, but most obviously by the relative proportions of the marginal and first and second submarginal cells.

[To be continued.]

(p. 258)

XXIII.—*Description of the Snake-nut Tree of Guiana.* By
ROBERT H. SCHOMBURGK, C.M. R.G.S.*

[With a Plate.]

FOR several years past nuts of the size of a walnut were brought from the interior to Georgetown in Demerara, the kernel of which when opened, and the membrane which covered it being removed, displayed the striking resemblance to a snake 'coiled up.' There was the head, the mouth, the eyes, so complete, that one unacquainted with the fact would have believed them to be an imitation made by human hands, and not a freak of nature. As is often the case with the productions of the interior, the colonists were entirely unacquainted with the mode of growth of the plant which produced these strange nuts.

They were generally found after the annual swelling of the Essequibo had subsided along its banks, and for a length of time it was pretended that they grew on a creeper; and from the resemblance of its kernel to a snake, it was supposed that it might prove an antidote to snake-poison. After my return from the interior of British Guiana, and while at the post Ampa at the Essequibo, I ascertained from Mr. Richardson, then postholder, that the snake-nut was the fruit of a large tree, and that several grew in the vicinity of his abode. I therefore embraced the first opportunity to ascend the brook Ampa in order to see it.

The tree stood near the banks of the brook, as also did other trees of the same description which I saw afterwards, and this explains its fruits being so frequently found along the low banks of the islands Leguan, Wakenaam, &c., on the mouth of the Essequibo.

The tree was just about ceasing to bear for the season, and began to put forth its blossoms; unfortunately they were not far enough advanced to determine without hesitation its class and order, but there is no doubt that it belongs to the natural order of *Terebinthaceæ*, nearly related to the division *Ju-*

* Communicated to the Linnæan Society, and read June 6, 1837.

*glandiæ**. All the buds which I opened consisted apparently of 3 stamens and 1 pistil; the calyx was imbricated, and this might have induced me to consider it a *Carya* or *Juglans*; but the leaves of the tree in question are smooth and entire, while those of the others, with the exception of two species, are serrated.

It is not a *Carya*, the nut of which is 4-angulated and 4-valved, while the nut of *Juglans*, as well as the snake-nut, is 2-valved. I had requested Mr. Richardson to procure me some of the flowers of the Snake-nut tree when perfectly open, but he did not succeed in drying them, which unfortunately prevented him from sending any, and I am thus obliged to wait for another opportunity of correctly describing this remarkable plant. I offer the following description meanwhile provisionally.

Order. TEREBINTHACEÆ.

Calyx imbricatus. Corolla 3-petala. Drupa bivalvis. 1-sperma.

Vulg. Snake-nut tree.

Arbor excelsa, truncus glaber, cortice lævi cinereo. Folia pinnata; foliola petiolata 3—6-juga cum impari, lanceolato-ovata, acuminata, integerrima, subcoriacea, venosa, glabra, nitida. Petioli universales supra canaliculati, glabri, articulati, partiales breves. Flores paniculati; paniculæ in ramulis terminales subinde axillares; ramosæ; floribus brevissime pedicellatis, numerosis confertis. Calyx imbricatus. Corolla 3-petala, ovata, concava. Drupa coriacea unisperma, unilocularis, glabra, sphaerica. Nux dura, glabra, bivalvis, unilocularis; nucleo albo.

Hab. in sylvis Guianæ prope fluvium Essequibo. Floret Aprili.

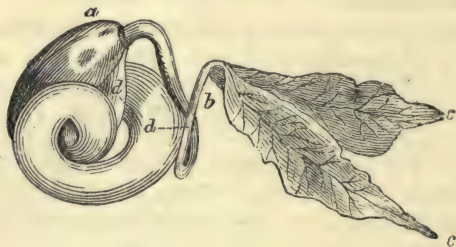
It is a tree of the first magnitude; its bark is gray, rather smooth, dividing in a few branches at a height of from 40 to 60 feet, adorned with pinnated leaves, consisting generally of four to six pairs with an odd one; the common foot-stalk as well as the petioles are articulated, the former channeled; the leaves entire, lanceolate, ovate, acuminate, lucid, coriaceous, their colour between light and dark green, with a shade lighter below. The flowers appear in panicles, are pendulous, and the flower-stalks of red-brown colour, almost farinaceous, chiefly the smaller flower-stalks; verticillate and

* It stands perhaps between the *Anacardiæ* and *Juglandiæ*.

sparely flowered; the calyx is imbricated, the corolla has 3 petals, ovate and concave, and is of a lilac colour.

What is most remarkable is however the fruit, a thin coriaceous drupa, with a smooth nut, the kernel of which resembles a snake most strikingly.

It is covered like the walnut with a membrane; the embryo is roundish; the head of the snake becomes a claviform radicle, and the tail (Mirbel's *scapellus* or DeCandolle's '*tigelle*') bears two large foliaceous cotyledons, with several nerves, depressed, plaited, and applied to the radicle; the colour of the embryo and cotyledons is white, but the nerves of the latter are of a lake colour; as soon as exposed to the air they change into a dark-brown. When the fruit is about to germinate, the *scapellus* or '*tigelle*' bends towards the base of the cotyledons, bursts the nut, and having made room for the seed-lobes, they unfold and take an erect situation, while the rhizoma has sent its roots into the earth.



No trials have been made whether the tree or its fruit possess any medicinal properties: as already observed, the resemblance of a snake has induced the populace to consider it an antidote for snake-poison. The tree appears to be peculiar to the lower part of the river Essequibo and its tributaries, at least it has not as yet been found anywhere else. It blossoms in March and April, and its fruit comes to maturity in November.

The above figure exhibits the appearance of the embryo after the outer shell has been removed: *a*, is the radicle or rhizoma; *b*, the neck, tigelle, or collet; *c*, the two cotyledons, which have been unfolded, as they are otherwise applied to *d d*, and partly surround the embryo.

The figures in Plate III. represent the Nut and its snake-like Kernel.

XXIV.—Information respecting Botanical Travellers.

Extracts from a Journal of the Mission which visited Bootan, in 1837–38, under Captain R. BOILEAU PEMBERTON. By W. GRIFFITH, Esq., Madras Medical Establishment.

[Continued from p. 125.]

March 1st. Proceeded to Byagur or Juggur. The vegetation continued the same, the road traversing either sward or fir woods, consisting entirely of *Pinus excelsa*. The valley in which Byagur is situated is still larger than that of Bhoomlungtung: it is drained by a large river, which is crossed by a somewhat dilapidated wooden bridge; the elevation is about 8150 feet. The cultivation is similar to that of the other valley, but the crops looked very unpromising. The soil is by no means rich, and the wind excessively bleak; wheat or barley are the only grains cultivated. The mountains which hem in this valley are not very lofty; to the north, in the back ground, perpetual snow was visible. To our west was the ridge which we were told we should have to cross, and which in its higher parts could not be less than 12,000 feet.

March 4th. We commenced ascending the above ridge almost immediately on starting; surmounting this, which is of an elevation at the part we crossed of 11,035 feet, we continued for some time at the same level, through fine open woods of *Pinus Smithiana*: having descended rapidly afterwards to a small nullah, 9642 feet in elevation, we then reascended slightly to descend into the Jaisa valley. On the east side of the ridge, i. e. that which overlooks Byagur, we soon came on snow, but none was seen on its western face, notwithstanding the great elevation. The country was very beautiful, particularly in the higher elevations. I may here advert to the bad taste exhibited in naming such objects after persons, with whom they have no association whatever. As it is not possible for all travellers to be consecrated by genera, although this practice is daily becoming more common, we should connect their names with such trees as are familiar to every European. As we have a *Pinus Gerardiana* and *Webbiana*, so we ought to have had *Pinus Herbertiana* and *Moorcroftiana*, &c. By so doing, on meeting with fir trees among the snow-clad Himalayas, we should not only have beautiful objects before us, but beautiful and exciting associations of able and enduring travellers. Of Capt. Herbert, the most accomplished historian of these magnificent mountains, there is nothing *living* to give him a "local habitation and a name." It will be a duty to me to remedy this neglect; and if I have not a sufficiently fine fir tree hitherto unde-

scribed in the Bootan collection, I shall change the name of the very finest hitherto found, and dignify it by the name *Herbertiana*. The prevailing tree was the Smithian pine. We saw scarcely any villages, and but very little cultivation. Jaisa is a good-sized village; it was comparatively clean, and the houses were, I think, better than most we had hitherto seen. There is a good deal of wheat cultivation around the village, which is not the only occupant of the valley: this is the highest we had yet seen, and is perhaps one of the highest inhabited valleys known, as it is 9410 feet above the sea; it is drained by a small stream, and is of less extent than either that of Byagur or Bhoomlungtung. The surrounding hills are covered with open fir woods, and are of no considerable height. Larks, magpies, and red-legged crows, continued plentiful, but on leaving this valley we lost them.

March 5th. We proceeded up the valley, keeping along the banks of the stream for some time; we then commenced ascending a ridge, the top of which we reached about noon; its elevation was 10,930 feet. The descent from this was for about 2500 feet very steep and uninterrupted, until we reached a small torrent at an elevation of 8473 feet; from this we ascended slightly through thick woods of oak, &c. until we came on open grassy tracts, through which we now gradually descended at a great height above the stream, which we had left a short time before. We continued descending rather more rapidly until we came to a point almost immediately above Tongsa, by about 1000 feet; from this the descent was excessively steep. The distance was 13 miles. On the ascent snow was common from a height of 9000 feet upwards. The vegetation on this, or the eastern side, was in some places similar to that above Byagur. Beautiful fir woods formed the chief vegetation, until we came close to the summit, when it changed completely. Rhododendrons, *Bogh puttah*, and a species of birch and bamboos, were common, mixed with a few black pines. The woods through which we descended, were in the higher elevations almost entirely of rhododendrons; and lower down chiefly of various species of oak and maple—the former being dry and very open, the latter humid and choked up with underwood. After coming on the open grassy country we did not revert to well-wooded tracts. No villages occurred, nor did we see any signs of cultivation after leaving the valley of Jaisa until we came near Tongsa, above which barley fields were not uncommon. Tongsa, although the second, or at any rate the third place in Bootan, is as miserable a place as any body would wish to see. It is wretchedly situated in a very narrow ravine, drained by a petty stream, on the

tongue of land formed by its entrance into the large torrent Mateesum, which flows 1200 feet below where the castle stands. The surrounding country is uninteresting, the vegetation consisting of a few low shrubs and some grasses: of the former the most common are a species of barberry, and a hitherto undescribed genus of *Hamamelidæ*. No woods can be reached without ascending 1200 or 1500 feet. Barley was the chief cultivation we saw, but the crops alternated with rice, which is here cultivated as high as 6800 feet. In the gardens attached to the cottages, or rather huts, we observed the almond and pear in full blossom: the only other trees were two or three weeping cypresses and willows, and a solitary poplar. Nothing could well exceed the discomfort we had to undergo during our tedious stay at this place. Our difficulties were increased subsequently to our arrival by the occurrence of unsettled weather, during which we had ample proofs that Bootan houses are not always water-proof; we were besides incessantly annoyed with a profusion of rats, bugs, and fleas; nor was there a single thing to counterbalance all these inconveniences, and we consequently left the place without the shadow of a feeling of regret.

March 24th. To Tchinjipjee. We commenced by ascending until we had surmounted a ridge about 800 feet above Taseeling; during the remainder of the march we traversed undulating ground at nearly the same altitude, at first through an open country, afterward through beautiful oak and magnolia woods, until we came on the torrent above which we had been ascending since leaving the Mateesum; a little further on we came on the finest temple we had seen, and situated in a most romantic spot. It stood on a fine patch of sward, in a gorge of the ravine, the sides of which were covered with beautiful cedar-looking pines; the back ground was formed by lofty mountains covered with heavy snow. Following the river upwards for about a mile and a half, we reached Tchinjipjee, which is situated on the right bank of the torrent. The march was throughout beautiful, particularly through the forest, which abounded in picturesque glades. No villages or cultivation were seen. Tchinjipjee is perhaps the prettiest place we saw in Bootan; our halting-place stood on fine sward, well ornamented with (*Quercus seme carpifolia*?) very picturesque oaks, and two fine specimens of weeping cypress. The surrounding hills are low, either almost entirely bare or clothed with pines. The village is of ordinary size, and is the only one visible in any direction; its elevation is 786 feet. There is some cultivation about it, chiefly of barley, mixed with radishes.

March 27th. We continued following the river upwards, the path

running generally at a small height above its bed. Having crossed it by a rude wooden bridge, we diverged up a tributary stream, until we reached a small village; we thence continued ascending over easy grassy slopes, here and there prettily wooded, until we reached the base of the chief ascent, which is not steep, but long, the path running along the margin of a rhododendron and juniper wood: the height of its summit is 10,873 feet. Thence to Rydang was an uninterrupted and steep descent, the path traversing very beautiful woods of rhododendrons, oaks, yews, &c. Snow was still seen lingering in sheltered places above 10,000 feet. The march throughout was beautiful. In the higher elevations the *Bogh Pat* was very common. Besides the village mentioned, two temporary ones were seen near the base of the great ascent, built for the accommodation of the Yaks and their herdsmen: of this curious animal two herds were seen at some distance.

March 28th. We descended directly to the river Gnee, which drains the ravine, and continued down it sometime, crossing it once; then diverging up a small nullah we commenced an ascent, which did not cease until we had reached an elevation of 8374 feet. Continuing for some time at this elevation we traversed picturesque oak and rhododendron woods, with occasionally swardy spots; subsequently descending for a long time until we reached Santagong, in the direction of which the trees became stunted, and the country presented a barren aspect. Santagong is 6300 feet above the sea; it is a small village, but the houses are better than ordinary. The surrounding country, especially to the north, is well cultivated, and the villages numerous. The country is bare of trees; almost the only ones to be seen are some long leaved firs, a short distance below Santagong, close to a small jheel abounding in water-fowl.

March 29th. From Santagong we proceeded to Phain, descending immediately to the stream, which runs nearly 1800 feet below our halting-place. Towards Phain the soil became of a deep red colour. This place, which is 5280 feet above the sea, is a small village, containing six or seven tolerable houses.

April 1st. To Punukka. We descended rather gradually towards the Patchien, proceeding at first north-west, and then to the north. On reaching the stream, which is of considerable size, we followed it up, chiefly along its banks, until we arrived at the capital, no view of which is obtained until it is approached very closely. The valley of the Patchien was throughout the march very narrow; there was a good deal of miserable wheat cultivation in it, and some villages, all of moderate size. The country continued extremely bare.

The distance was about eleven miles. Punukka, the second capital in Bootan, the summer residence of a long line of unconquered monarchs—Punukka, to which place we had been so long looking forward with feelings of delight, although the experience of Tongsa ought to have taught us better, disappointed all of us dreadfully: for in the first place I saw a miserable village, promising little comfort as respects accommodation, and one glance at the surrounding country satisfied me that little was to be done in any branch of natural history: for a narrow, unfruitful valley, hemmed in by barren hills, on which no arboreous vegetation was to be seen, except at considerable elevation, gave no great promise of botanical success. The capital of Bootan is for pre-eminence, miserable. The city itself consists of some twelve or fifteen houses, half of which are on the left bank of the river, and two-thirds of which are completely ruinous, and the best of these '*Capital*' houses were far worse than those at Phain or Santagong, &c. Around the city, and within a distance of a quarter of a mile, three or four other villages occur, all bearing the stamp of poverty and the marks of oppression. The palace is situated on a flat tongue of land formed by the confluence of the Matchien and Patchien rivers. To the west it is quite close to the west boundary of the valley, the rivers alone intervening. It is a very large building, but too uniform and too heavy to be imposing: it is upwards of 200 yards in length, by perhaps 80 in breadth. Its regal nature is attested by the central tower, and the several coppered roofs of this. The only cheering objects visible in this capital are the glorious Himalayas to the north, and a Gylong village 1200 or 1500 feet above the palace to the west; elsewhere all is dreary, desolate-looking, and hot. During the first few days of our stay, and indeed until our interview with the Deb, we were much annoyed by the intruding impertinence and blind obstinacy of his followers. They were continually causing disputes either with the sentries or our immediate followers, and it was only by repeated messages to the palace, stating the probable consequence of such a system of annoyance, that Capt. Pemberton succeeded in obtaining any respite. After many delays, we were admitted to the Deb's presence on the 9th. A day or two after, our interview with the Dhurma took place. He received us in an upper room of the quadrangular central tower: while we were in his presence we remained standing, in compliment to his religious character. The Dhurma Rajah is a boy of eight or ten years old, and good-looking, particularly when the looks of his father, the Tungso Pillo, are taken into consideration. He sat in a small recess, lighted chiefly with lamps, and was prompted by a very vene-

rable looking, grey-headed priest. He had fewer attendants, and his room was less richly ornamented than that of the Deb. Around the room sat priests busily employed in muttering charmed sentences from handsome gilt-lettered black books, which reminded me of those used in some parts of Burmah. During our protracted stay at this place nothing particularly worthy of notice occurred. Intrigues seemed to be constantly going on, and the trial of temper on the part of Captain Pemberton must have been very great; it was however soon evident that no business could be transacted with a Bootea Government without being enabled first to enforce abundance of fear, and consequently any amount of agreement from them; messages to and fro passed continually, the bearer being a very great rascal, in the shape of the Deb's Bengal Moharrer. Thus he would come and appoint the next day for a meeting; then he would return and say that such a place was better than such a place; as evening drew near, he would come and say, unless you agree to such and such, there will be no meeting; and after bearing a message that no change in this respect would be made, he would make his appearance and say, all the ministers were sick, and so could not meet. My only amusement out of doors was a morning walk up or down the valley: I was prompted to this chiefly by the pangs of hunger, as the Bootea supplies were very short, indeed wild pigeons afforded me at least some relief. During the day I examined such objects as my collectors brought in, for it was too hot to think of being out after 9 A.M. The climate of Punukka has but little to recommend it, and in fact nothing, if viewed in comparison with the other places we had seen in Bootan. The greatest annoyance existed in the powerful winds blowing constantly throughout the day up the valley, and which were often loaded with clouds of dust. The mean temperature of April may be considered as 71° . The maximum heat observed was 83° , the minimum 64° . The mean temperature of the first week of May was $75^{\circ} 3'$; the maximum 80° , and the minimum 70° . The cultivation in the valley, the soil of which seems very poor, containing a large proportion of mica, was during our stay limited to wheat and buck-wheat, but scarcely any of the former seemed likely to come to ear. Ground was preparing for the reception of rice, which is sown and planted in the usual manner. Crops just sown are immediately eaten up by the swarms of sacred pigeons that reside in the palace, so that husbandry is by no means profitable; more especially as there are other means of providing for the crops, such as they may be. Thus we saw several small fields, amounting perhaps to an acre in extent, cut down to provide fodder for some ponies that

had lately shared in a religious excursion to Wandipore. Cattle are not frequent. There were some pigs. The fowls were of the most miserable description, and very scarce. In spite of offers of purchase and plenty of promises, we were throughout allowed three a day, and they were rather smaller than pigeons. Towards the latter end of our stay rice became bad and scarce. There are a great number of Assamese slaves about Punukka : indeed, all the agricultural work, as well as that of beasts of burden, appears to devolve upon these unfortunate creatures, who are miserably provided for, and perhaps dirtier than a genuine Bootea himself. On the 9th May at noon we left Punukka, the most uninviting place I have ever seen in a hilly country. On the morning of the same day there was a demonstration in the palace of great boldness ; the roof of the northern side was covered with troops, who shouted, fired, and waved banners. We crossed both bridges of the palace without any interruption or annoyance, at which I was most agreeably surprised ; and then gradually ascended the right flank of the valley, following the course of the united rivers, Patchien and Matchien. We proceeded in this direction for some time, until we came on a ravine affording an outlet to a tributary of the Punukka river, which we then followed, gradually descending through fir woods until we reached the torrent. Crossing this, which is a small one, we commenced the ascent to Telagong, which we soon reached.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

A Report on the Progress of Vegetable Physiology during the year 1837. By F. J. F. Meyen, M.D., Professor of Botany in the University of Berlin. Translated from the German, by William Francis, A.L.S. London, 1839. 8vo. pp. 158.

To those who are interested in the cultivation of science it might appear superfluous to recommend such a work as this ; and yet the delay in its appearance, caused by the want of a sufficient number of subscribers at its very moderate price to cover the mere expenses of publication, seems to indicate that it is not sufficiently known or appreciated. No one can now assume any elevated position in botanical science who is not conversant with the structure and physiology of plants, as well as with their external forms and aspects. The time when the acquirements of a naturalist were measured by the number of species he had collected is now, we trust, gone by for ever, and *names* and *classifications* are looked upon by the man of

enlightened views as but the *mechanism* by which the true principles of science are to be worked out. Although Britain can boast of possessing some among the foremost in the rank of philosophical botanists, and of having contributed her full share of the most important discoveries of recent times, she must be content to remain far behind in regard to general knowledge of the science as long as the prevailing ignorance of its progress abroad shall continue to exist. To this our insular situation in part contributes; and it is partly due to the small amount of attention paid to natural history as a branch of general education. On both these points, however, we look for rapid improvement. Rail-roads and steam-boats will have an important influence on the progress of science as well as on the extension of commerce. The period is surely now commencing when "many shall run to and fro, and knowledge shall be increased." And in regard to education, we see many indications of an important change. There is a growing feeling amongst those who are engaged in it that the minds of the young may be trained with advantage to observe and reason upon the wondrous phænomena of the universe;—that to neglect the pages in which the *works* of the Creator are displayed to us is an error comparable with that of neglecting his *word*;—and that, for the object of intellectual discipline, the study of *things* may often be substituted for that of *words*, with the double advantage of interesting the pupil, and of giving him a store of knowledge which will be subsequently valuable. To this revolutionary innovation upon the old system the University of London has given its sanction, by requiring from candidates for its degree in Arts a knowledge not only of classics and mathematics, but of natural philosophy, chemistry, natural history, and physiology. In this we see much that augurs well for the progress of science in England. The youthful mind is much more apt in the acquirement of elementary knowledge than the adult, whose observing powers have been allowed to lie dormant at the time of their greatest activity; and, if a good foundation be early laid, we have no fear of a deficiency of motives for subsequent labour.

We have always regarded the study of Vegetable Physiology as the department of natural history best adapted to engage the attention of the young, from the facilities which offer themselves to its pursuit, and its freedom from those drawbacks so common in other branches. Its objects are never out of reach; for barren indeed must be that country which affords no shelter to the products of the vegetable kingdom. The meanest and most common herbs are in the eye of the physiologist as interesting as the majestic tree or the

rarest flower;—witness the important results obtained by Mirbel from the study of the *Marchantia polymorpha*. The toilsome labours of the collector are not required here, nor is the mind fatigued by the difficulties and technicalities of classification; and what renders the pursuit of this science especially adapted to the female sex is its freedom from the necessity of that corporeal suffering, which, however laudable its ultimate object, the truly humane mind will always dread to inflict upon its sentient fellow-beings.

There is another class upon which we would urge the necessity of attention to Vegetable Physiology—the students of medicine. Those who are sufficiently enlightened to perceive that a knowledge of the actions of the human body in health is the best preparation they can have for the study of its diseased conditions, will find it much to their advantage to have gained an early acquaintance with the vital phænomena exhibited by plants, which often exhibit changes whose conditions are obscure in animals, in a magnified form as it were, and in circumstances which allow them to be more easily studied. We especially refer to those concerned in reproduction and in the act of organization, on which new and important contributions have been recently made to vegetable physiology, that have led to equally successful researches into the corresponding mysteries of animal life. No one, it seems to us, can now be esteemed a scientific physiologist who does not embrace in the scope of his inquiries all classes of animated beings, and the more extended his basis the more certain and comprehensive will be his generalizations.

Periodical reports of the progress of any special department of science are, if well executed, among the most valuable additions to its literature, and this is particularly the case when the number of its cultivators is great, so that their contributions are spread over a wide surface. There is perhaps no science which stands more in need of such comprehensive sketches than Vegetable Physiology, and no individual who could execute them with more success than Prof. Meyen. Of the mass of information brought together in the Report before us, a great part would never have reached this country if it had not been thus embodied; and if it be thought that he has manifested less acquaintance with the progress of science in England than with the labours of German physiologists, it will be remembered that the fullness with which the latter are presented should make it peculiarly acceptable to the English reader, who may be supposed to be acquainted with the labours of his countrymen. The translation is very ably executed, and presents the ideas of the author with greater force and precision than most of our readers would

be likely to attain by their own perusal of the original; since it requires considerable familiarity with the German language to be able to render with accuracy the nicer shades of meaning which are often adopted from colloquialisms into scientific language. We would strongly urge upon our scientific friends therefore to encourage the continued translation of these valuable reports by aiding in the sale of the part before us. We feel confident that they will progressively increase in interest as the science advances towards perfection, and will afford a valuable and interesting record of its progress. To those who desire to be *au courant* with the present state of knowledge an acquaintance with them is indispensable.

A List of the Genera of Birds, with an indication of the Typical Species of each Genus. By George Robert Gray, Ornithological Assistant Zool. Departm. British Museum, &c., &c. 8vo. London, 1840.

This work, as its title indicates, contains a complete enumeration of the genera of birds, disposed according to a system "based on the arrangements of M. Cuvier and Mr. Vigors, with such improvements as in the author's view of the subject could be gleaned from those of Mr. Swainson and others." The number of genera enumerated, not including those names which are regarded as merely synonymous, amounts to 1065; but Mr. G. Gray avows his opinion that his List "contains some genera established upon characters too trivial to admit of their being definitively adopted." He states it indeed to have been his object, in the present publication, rather to give "a correct view of all the genera that have been proposed" than "closely to criticize the value of the subdivisions employed." We trust, however, that the latter more important task will be undertaken by him in a more extended work, in which the preface gives us reason to believe that he has long been engaged, viz. a "Genera of Birds," accompanied with their characters.

In the mean time the work before us may be regarded as a useful outline of the present state of Systematic Ornithology, comprehending a much more complete enumeration of genera than any that has preceded it; evincing great care in determining the priority of names, and showing due respect for that universal law (so recklessly infringed by many ornithologists) which scrupulously assigns the preference to prior publication. Under each genus are added the synonyms, or those names which have been employed to designate species of the group; one species is cited as an example, a figure being referred to whenever it exists; and occasional rectifications of syno-

nymy occur with regard to the species mentioned. By these means the work is rendered highly useful to the ornithological student, and especially to those who are desirous of obtaining an index to the extensive subdivisions that have been made within the last few years in this interesting department of zoology, through which the number of genera has been so largely increased. It bears every appearance of having been compiled and arranged with industry, diligence, and good faith.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

Aug. 13, 1839.—William Yarrell, Esq., Vice-President, in the Chair.

A collection of Bird-skins, from the neighbourhood of Erzeroom, presented to the Society by E. D. Dickson, and H. J. Ross, Esqrs., was exhibited.

The species contained in this collection were brought under the notice of the Meeting by Mr. Fraser, and the following notes (made by Messrs. Dickson and Ross) which accompanied them, were read.

Buteo ———? August 20†. Very common: arrives middle of March, and leaves middle of November.

* *Falco tinnunculus*, Linn. M†. April 28. Common. Iris dark hazel. A mouse found in its stomach. This bird was perched on a tree, with some starlings and sparrows.

Falco tinnunculus, Linn. F. April 29. A bird and a frog found in its stomach. Five well-developed eggs in the ovarium. Another had eight eggs, besides a great many small ones, and its stomach contained a frog and some scaly substances, probably a portion of a fish. It breeds in April, on lofty poplars, and also on the top of minarets. Arrives early in April and departs late in November.

Falco Aesalon, Temm. M. April 23. Eyes large, round, and of a bluish-black colour: rim of eyelids, cere, and legs, bright yellow. A great number of thin tough worms, from one to two inches long, between the peritoneum and muscles on the left side: neither stomach nor intestines contained any.

Milvus ater, Gould. M. May 10. Common. Shot on a tree close to the town. Eyes large, of a light cinnamon colour, and with a black ring round the iris. Testicles reniform; yellow. Arrives middle of March.

Noctua Indica, Franklin. August 1. Common about the foot of the mountains near the town.

† The date when the specimen was procured.

* The species marked with an asterisk have been noticed in the Proceedings as inhabitants of Trebizond, a locality not far distant from Erzeroom. See Proceedings for 1834, pp. 50 & 133; for 1835, p. 90; and for 1837, p. 126.

‡ The letter M stands for male, and F for female, throughout the paper.

Cypselus murarius, Ill. M. May 24. Very abundant. Arrives beginning of May, leaves late in September.

Merops Apiaster, Linn. F. May 20. Gizzard full of insects. Arrives middle of May, leaves latter end of September.

**Coracias garrulus*, Linn. September 6. Common in various localities. Arrives early, and departs late in September.

Collurio minor, Vig. August 6. Common. Frequents haycocks. Arrives beginning of August, leaves middle of September.

Oriolus galbula, Linn. F. September 2. Rather rare. Found in willow-trees. Arrives early in August and departs middle of September.

**Cinclus aquaticus*, Bechst. F. December 9. Very few seen. Frequenting a mountain stream. Shy: flies rather high: food, small crustacea. Eyes light hazel. Two small oval appendages, one on each side of the rectum; hollow, and communicating with its cavity. The down on the breast very thick.

Motacilla alba, Linn. Not uncommon. Arrives end of September and departs end of October. Migratory.

Budytes melanocephala, Savi. M. June 7. Very common on moist ground: food, insects. Arrives middle of April and leaves early in November.

Phenicura ruticilla, Swains. M. April 29. A straggler: found in a garden in Erzerroom.

**Saxicola Œnanthe*, Bechst. Eyes hazel. Frequents rills; also found on adjacent hills.

Saxicola Œnanthe, Bechst. M. May 27. Common all over the neighbourhood. Food, coleopterous insects and caterpillars.

Saxicola rubetra, Bechst. A few seen in April.

**Erythaca rubecula*, Swains. (In spirit.) Found in a stony ravine in November; the only one yet noticed.

Sylvia hippolais, Penn. August 15. A few seen on high thistles, in moist situations, from the commencement of April to the middle of October. Migratory.

Salicaria Cetti? Gould. October 28. Caught in a stable after the first falls of snow. Neither this bird nor several others of the same family procured at the time had any tails.

Anthus arboreus, Bechst.

Anthus rufescens, Temm. F. June 2. Found on the adjacent hills. Gizzard filled with coleopterous insects.

Alauda Calandra, Pall. Rather numerous: frequents fields. Arrives end of October and departs late in September. Migratory.

Alauda arvensis, Linn. Very common in summer.

**Alauda* ———? Not very common. Food, the grain found among horses' dung. This variety differs from the preceding species in the construction of the bill. It is only found in winter, and occurs in flocks, in company with the Horned Lark (*Alauda penicillata*).

Alauda brachydactyla, Temm. Seen in large flocks. Only noticed from 21st of April to 28th of May. Frequents fields and the hills. The cock is of a brighter colour than the hen, and has its ears and the spot on the breast much darker.

Alauda penicillata, Gould†. Numerous: food, seeds. The specimens sent are not so bright as the living bird, probably from the effects of the arsenical soap. The males differ from the females in being of a brighter colour, and in having the black feathers on the top of the head much more distinctly marked. The yellow gorget of both, in winter is bright, and in summer remarkably faint, while the purple on the nape is *vice versâ*. During the hot months they are found on the neighbouring mountains, from which they are driven down to the plain in winter in quest of food, which consists then of the grain found in the dung of cattle, the ground being at that time covered with snow several feet in depth. They fly in companies of from three to twelve birds; are very familiar, especially so in winter, when they may be killed easily with an ordinary whip. When approached, or in the agonies of death, they erect their horn-shaped crest quite perpendicularly, with the tips curved inwards. They run on the snow with surprising rapidity: as soon as the snow has melted on the plain they return to the mountains.

**Emberiza miliaria*, Linn. M. & F. April 23, June 5. Common in the fields close to Erzeroom. Feed on corn.

**Pyrgita domestica*, Cuv. M. Excessively common. Begin to pair and build about the end of April and beginning of May.

Pyrgita petronia, Gould. M. May 28. Very common, observed in the spring and summer months in steep and stony ravines. Gizzard filled with wheat and chaff.

Fringilla nivalis? Linn. May 27. Rare: food, insects. Found in the neighbouring hills.

Linaria montana, Ray. October 14. Noticed from the 20th of September to the 18th of November, in companies.

Fringilla sanguinea, Gould‡. May 28. Tolerably common. First appears on the neighbouring hills, and afterwards in the plains, at no great distance from them. Food, the unripe seeds of the *Cichoraceæ*. The young bird has a lighter plumage, and its skin is of a deep pink colour. Arrives in the middle of May, and departs in the middle of September.

Pterocles arenarius, Temm. M. & F. Very common. Iris dark hazel; margin of eyelids pale light yellow. Food, grain, vetches, tares, &c. Said to breed towards the end of April, on the adjoining hills, amongst loose stones. Arrives in the beginning of April; they are then seen in those fields that are free from snow, close to the town. In summer frequents bare sterile grounds. Quits Erzeroom about the end of September. Native name, *Bahghr-Kahrah* (Black Belly).

**Otis tetrax*, Linn. Very common in ploughed fields and on the skirts of the marsh. Arrives early in September, and departs in the middle of November. Native name, *Mez-mel-dek*.

Glareola limbata, Rüpp. September 8. Rare. In flocks in marshy situations.

Vanellus cristatus, Meyer. September. Very numerous. Arrives

† Proceedings Zool. Soc. 1837, p. 126.

‡ *Ibid*.

at the end of March and departs at the end of November. During summer frequents the river†, but on its arrival and previous to its departure it is found in moist fields near Erzeroom. Native name, *Kiz-Cooshóo* (Maiden's Bird), or *Kahmaum-Cooshóo* (Bath-bird).

Vanellus Keptuschka, Temm. September 17. A few observed from the middle of September to the middle of October. In flocks. This specimen sent had its right leg shrivelled up.

Charadrius morinellus, Linn.

Charadrius minor, Meyer. June 26. Numerous on the sandy and pebbly banks of the Aras at Hassán-Kaléh (18 miles east of Erzeroom), about the middle of June. The naked rim round the eye is of a deep sulphur colour. None of these birds have been noticed at Erzeroom.

Tringa subarquata, Temm. Numerous about the streams at So-ook-Tcherméh, a village four miles from Erzeroom.

Tringa minuta, Leisl. August. Plentiful at Tchif-lík, a village five miles distant, close to the houses, about pools, in company with sparrows and starlings.

Tringa minuta, Leisl. September 15. Abundant at the village of So-ook-Tcherméh.

Limosa melanura, Leisl. November 15. One leg had apparently wasted and dropped off, and the other was found in an incipient state of atrophy, like that in *Vanellus Keptuschka*, Temm., but not in so great a degree.

**Himantopus melanopterus*, Meyer. End of July. Not very common. On the borders of the river. A naked rim round the eyelid, of a bright vermilion colour.

Ardea alba, Linn. Not many: seen only at the river, from the commencement of May till the beginning of October. Sometimes in flocks and sometimes solitary.

Ibis Falcinellus, Temm. End of August. Seen during the hot months at the river.

Ibis ——— ? End of August. Not uncommon: about the river in August. Food, shell-fish: has a remarkably thick gizzard.

Fulica ater, Linn.

Tadorna rutila, Steph. August 30. Very abundant: gregarious. During the day frequents marshes, but feeds late in the evening and early in the morning, in corn and stubble-fields. Arrives in the middle of March and departs at the end of November: rarely seen in the water. Said to breed in the marshes. Great numbers on the Lake of Van in August. Native name, *Ahn-goót*.

Sterna nigra, Linn. Very common about the river during spring and summer.

The collection also contains specimens of *Cricetus accedula* (*Mus accedula* of Pallas.), which species is "very common. The eyes are large and black; cheek-pouches spacious, extending from the angles of the mouth to the back of the head, a little beyond the ear. It is

† The river referred to in this paper is the *Karah-Soo*, or northern branch of the Euphrates.

one of our domestic mice. In winter it is sometimes found on the snow; its fur is then silky and glossy."

The common mouse (*Mus musculus*) is said to be very common in houses at Erzeroom.

The Spalax (*Spalax typhlus*, Illig.), a specimen of which is also sent, is said to be "common all over the plain. Its food is roots, but it will readily eat bread: its paws are thick and fleshy: it is very expert in burrowing, which it performs with all four of its feet. The pericardium is excessively thin and transparent, and without any traces of fibrous texture. The left lung is entire, and the right one divided into four lobes; heart, pancreas and kidneys, natural; peritoneum of exactly the same structure and appearance as the pericardium; liver five-lobed, with a small appendix; a large thick, round blotch (resembling an ulcer) on the inner surface of the great curvature of the stomach; spleen narrow, very much elongated, and adhering to the posterior and left side of the stomach; *capsula renales* firmly attached to the upper end of the kidneys; cæcum and *appendix vermiformis* of an enormous size, in proportion to the intestines: between the rectum and bladder a flat white substance, of a follicular structure, and terminating at its posterior extremity in a thick fleshy canal. Native name, *Kior-Seetchán* (Blind Rat)."

MISCELLANEOUS.

BOTANICAL INFORMATION.

"*Unio Itineraria*."

BELIEVING that many readers of the Annals of Natural History are unacquainted even with the existence of the Society whose notice is now about to be laid before them, it may not be amiss in the first place just to give a concise account of its simple organization and government before making known the Report of its present operations and progress; both the Report and the short account thereto prefixed have been translated and carefully abridged from the printed circular of the Society and from the file of correspondence received by their London agent from the Secretaries, Drs. Steudel and Hochstetter: the latter—the correspondence—comes down to the 20th March, 1840.

Abstract from the laws of the Society:—

"1. The Wurtemberg Natural History Travelling Union, generally known among botanists as the '*Unio Itineraria*,' consists in a society of the friends of natural history (especially botany), who at their general expense send out and support travellers and collectors of specimens illustrative of natural history, chiefly botanical, in the

most interesting, little known, and far distant parts of the world, under the superintendence of directors, secretaries, &c.

“ 2. The introduction to this Society is open without limitation to amateurs and collectors generally ; its only conditions are the subscribing a fixed sum for one or more shares (or even portion of shares) in each or any of the announced expeditions ; such sum to be paid at the time of entering the application, &c.

“ 3. Each subscriber may bespeak either a larger or smaller share in the anticipated proceeds of any given enterprise as may suit his wishes or convenience, recollecting, however, that the most liberal and extensive supporters have the first claim for the most complete collections, &c.”

The above appears to give a sufficient intimation as to the general rules of the Society, which, however, extend to seven principal enactments.

Report of the present position of the Society and its enterprises : the latter, now in progress, extend to three principal expeditions, viz. :—

First, That confided to Wilhelm Schimper into Abyssinia. Of this a portion of the dried plants is now being distributed into sets for the subscribers under the eye of the secretaries at Esslingen, who report that the first delivery will (it is hoped) be ready in about two months' time ; this will include the plants collected up to the close of the year 1837, and contains *many* genera entirely new to European botanists, and about *one-half* of the number of species will also, it is believed, prove new and undescribed. The seeds have already arrived, and are by this time in the hands of the various subscribers in Europe ; they consist of small packets of 100 species, and some few sets are made up of 200 species.

Second, Kotschy's journey into Southern Nubia, Cordofan, Faskel, &c., is looked upon by botanists with scarcely less interest than the former one by Schimper into Abyssinia, embracing as it does a most extraordinary region, and one whose botany is at present almost entirely unknown, with the exception of some small previously obtained collections made by the same traveller a few years ago, and which, being offered for sale at Vienna, were eagerly purchased. Intelligence from Theodore Kotschy is now anxiously looked for, as none has been received of a very recent date. That already possessed by the Society warrants them in earnestly inviting more subscribers to come forward and support this most deserving and courageous young man in an expedition of no ordinary interest and

importance, which indeed will form a continuation or supplement nearly allied to that of Schimper. It is in the full expectation of a part of Kotschy's collections being received at Esslingen from this traveller in the course of the present year that the directors of the Society feel themselves warranted in requesting new members to subscribe for shares from so low as 30 to 60 florins (3*l.* 3*s.* to 6*l.* 6*s.* sterling) or upwards, according to the portion they may wish to secure. The subscription price is fixed at the same as Schimper's was, viz. 15 florins (1*l.* 11*s.* 6*d.* sterling) per 100 species.

Third, Welwitsch, who has been despatched to the Azores and Cape de Verde islands, and whose collections (including the plants he gathered during his detainment at Lisbon, and which are themselves far from inconsiderable) are shortly expected to arrive. A single share for this expedition is stated at 24 florins.

* * * The Society still have at disposal to Non subscribers a few collections from the former expeditions, viz. Georgio-Caucasian, North American, and Egyptio-Arabian, at from 15 to 25 florins per century.

9, Queen-street, Soho-square, London,
May 1st, 1840.

NOTE ON *ARGULUS FOLIACEUS*, JURINE. BY WM. THOMPSON,
VICE-PRES. NAT. HIST. SOC. OF BELFAST.

Belfast, Oct. 29, 1838.—In our market today I had the pleasure of detecting one of these very interesting and handsome parasites attached to the dorsal fin of a *Salmo Trutta*, about a foot in length. The *Argulus* is $3\frac{1}{2}$ lines long, is a female, and in addition to the ova exhibits at the base of the tail the dark green spots ("noirs," Desm. Consid. Gen. Crust., p. 332), which are considered to mark this sex. Although the fish to which it was attached had been for some hours out of the water, the *Argulus* held so firmly by its two disks that I had some difficulty in detaching it without injury. For about ten minutes it was wrapped in a piece of dry paper, and then placed in a vessel of water in which salt had been dissolved until it was to the taste like strong sea-water*. This was no sooner done, than my pretty captive, after drawing her last pair of feet together several times†, thus calling to mind the common house

* This was done in consequence of my having been told that the fish was taken in the sea; the stomach, however, contained the remains of fresh-water insects (according to my friend A. H. Haliday, Esq., to whose inspection they were submitted), which possibly might have been washed into the sea and there obtained, but this is by no means probable.

† I observed this repeatedly done afterwards—they seem to be rubbed against the caudal plates.

fly, struck out her oars, and thereby was rapidly impelled through the fluid.

The figures of Desmarest (tab. 50.) and Yarrell (Brit. Fish., vol. ii. p. 399.) are very characteristic of this species, but the great beauty exhibited in the specimen before me is at the same time not shown, perhaps in consequence of the upper side of the female not being represented—this consists in its being closely spotted with very dark green along the central part of the body for two-thirds posteriorly commencing a little above the ovary in the form of a head, and extending to the posterior portion; the rest of the upper side of the body being of a very pale yellowish green hue and semi-transparent as described, the part thus spotted is well defined, and is strikingly of the form of a coleopterous insect, which the *Argulus* in another point of view resembles, when the two sides of the greenish transparent “boucliers” are thrown a little apart, as we see the elytra of the insect. I was further reminded of the resemblance when attempting to remove it, as in holding firmly by the suckers, the body was drawn in, and the “boucliers” elevated quite above it. Its motion through the water seems equally rapid whether it be on the upper or under side, or swimming retrally—it frequently moved along the surface with its back downwards, and was wholly immersed except the suckers, which were thrown either on a line with the water or quite above it, and thus would the animal occasionally remain quiescent for a short period.

The constant motion of these organs (visible to the naked eye) in addition to the rapid play of the feet, impart much life to the appearance of the *Argulus*, and present not the same aspect for two continuous seconds of time, whether the body be at rest or otherwise. They—i. e. the marginal row of minute suckers, which appear as a dark line round the disk in figures of the species—are frequently drawn together to the centre of the disk, exhibiting a dark point not larger than the eye.

The eye itself, under the lens or microscope, exhibits constant motion, and even to our unassisted vision its red colour—that of the lady bird, *Coccinella septempunctata*—is apparent; when magnified it looks black where the lines and dots are, red elsewhere.



After having been about four or five hours in the salt water, and displaying its wonted activity to the last, the specimen was lost during my absence from the room. I had intended to observe how long it—a freshwater species—would live in salt water, but though foiled

in this, have thought these notes, made with the living animal before me, might perhaps be worth the room they occupy, more especially as the *Argulus* seems to be very little known as a British species. From what has been stated it would seem to be very tenacious of life. The individual here treated of is the second Irish one I have seen; the other was, when swimming freely in Lough Neagh, taken by Mr. Hyndman in the autumn a few years since. Like the present specimen, it displayed a mass of large ova.

INFUSORIAL ANIMALCULES IN RED SNOW.

Mr. Shuttleworth relates, that being occupied in the examination of some red snow that fell at the Grimsel, and expecting to see only inanimate globules of *Protococcus nivalis*, he was astonished to find that it was composed of organized bodies distinct in nature and form, partly vegetable, but the greater number endowed with the liveliest powers of motion, and belonging to the animal kingdom. Among these he has named one species *Astasia* [Ehrenb.] *nivalis*, and another *Gyges sanguineus*.—*Bibl. Univ.*

METEOROLOGICAL OBSERVATIONS FOR MARCH, 1840.

Chiswick.—March 1, 2. Cold and dry. 3. Cloudy. 4. Bleak and cold. 5. Frosty: cold and dry: sharp frost at night. 6, 7. Frosty haze: fine. 8, 9. Clear and frosty: fine. 10. Very fine. 11. Drizzly. 12. Cloudy. 13. Hazy: fine. 14. Overcast: very fine. 15. Slight rain. 16. Fine but cold. 17. Clear. 18. Overcast. 19, 20. Cloudy and cold: clear. 21. Very clear. 22. Overcast. 23. Fine but cold. 24, 25. Clear and cold. 26—28. Cloudy and cold. 29, 30. Cloudy and fine. 31. Drizzly.

It may be observed that the quantity of rain in this month was less than 3-10ths of an inch. The barometer stood remarkably high and in general very steady.

Boston.—March 1—3. Fine. 4. Stormy. 5—8. Fine. 9. Cloudy. 10. Fine. 11, 12. Cloudy. 13. Fine. 14. Rain. 15. Cloudy: rain P.M. 16, 17. Cloudy. 18. Rain: rain P.M. 19, 20. Cloudy. 21. Fine: snow early A.M. 22. Cloudy: rain P.M. 23. Cloudy: snow early A.M. 24. Hail: snow early A.M. 25. Fine: snow early A.M. 26. Fine: snow P.M. 27, 28. Cloudy. 29. Cloudy: rain P.M. 30, 31. Cloudy.

Applegarth Manse, Dumfries-shire.—March 1, 2. Fine clear day: frosty. 3. The same: getting cloudy P.M. 4, 5. The same: still freezing. 6. Remarkably fine day: gentle frost. 7—9. The same: hoar frost A.M. 10. The same, but threatening change. 11. The same, but cloudy: no frost. 12. The same: continuing cloudy: no frost. 13. Dry and boisterous: cloudy. 14. Dry but cloudy. 15. Fine day: rain A.M. 16. Slight rain morning: cleared up. 17. Fine: frosty early A.M. 18. Fine: the same. 19. Fine: without frost. 20. Fine: hoar frost. 21. Fine: strong frost. 22. Fine: getting cloudy. 23. Passing showers of snow and hail: frosty. 24, 25. The same: very cold: frosty. 26. Fair but cloudy. 27. Fine but dull. 28. Remarkably fine day. 29. The same after a shower A.M. 30. Wet morning: drizzly all day. 31. Occasional showers.

Sun shone out 29 days. Rain fell 5 days. Snow and hail 1 day. Frost and hoar frost 17 days.

Wind north $1\frac{1}{2}$ day. North-east $8\frac{1}{2}$ days. East 2 days. South 4 days. South-west 3 days. West 2 days. North-west 6 days. North-north-west 1 day. North-north-east 1 day. Variable 2 days.

Calm 15 days. Moderate 9 days. Brisk 5 days. Strong breeze 2 days.

Days of Month. 1840. March.	Barometer.				Thermometer.						Wind.				Rain.			Dew point. Land: Roy. Soc. 9 a.m.	
	Chiswick.		Boston. 8½ a.m.	Dumfries-shire. 9 a.m.	84 p.m.	London: Roy. Soc. Fahr. Self-register. 9 a.m.		Chiswick.		Dumfries-shire.		Chiswick. 9 a.m.	London: Roy. Soc. 9 a.m.	Dumfries-shire.	Boston.	Dumfries-shire.			
	Max.	Min.				Max.	Min.	Max.	Min.	Max.	Min.								
1.	30.374	30.422	30.399	30.12	30.42	30.45	32.7	33.2	30.7	39	29	35	33	ENE.	...	...	ENE.	28
2.	30.438	30.503	30.459	30.20	30.51	30.52	36.8	37.4	31.2	45	32	37.5	33	NE.	...	...	E.	25
3.	30.430	30.481	30.408	30.12	30.51	30.53	38.8	39.6	35.0	48	30	41	39	NE.	...	...	calm	32
4.	30.386	30.425	30.382	30.10	30.50	30.45	35.8	36.3	32.8	48	24	37	41	N.	...	...	E.	30
5.	30.408	30.538	30.413	30.10	30.38	30.33	35.4	36.0	32.6	50	19	37	46	E.	...	...	calm	29
6.	30.454	30.570	30.479	30.06	30.36	30.38	36.7	37.2	32.0	53	20	37.5	50	ENE.	...	...	S.	30
7.	30.564	30.664	30.580	30.20	30.45	30.53	37.7	37.8	32.7	52	21	35	50	N.	...	...	calm	32
8.	30.656	30.726	30.683	30.27	30.57	30.59	37.7	39.0	32.7	54	20	33	49	N.	...	...	calm	30
9.	30.640	30.676	30.593	30.24	30.59	30.49	37.2	38.0	31.7	56	25	33	58	N.	...	...	calm	31
10.	30.392	30.430	30.322	29.95	30.35	30.32	39.0	47.4	35.3	56	41	37	53	NNW.	...	...	SSW.	33
11.	30.284	30.369	30.301	29.88	30.32	30.30	42.8	53.7	38.6	46	34	43	49	N.	...	...	W.	30
12.	30.274	30.295	30.244	29.82	30.20	30.10	43.8	46.3	40.8	51	29	42	49½	N.	...	...	calm	33
13.	30.106	30.143	30.050	29.62	29.97	29.95	45.0	46.0	40.7	53	39	43	47½	NNW.	...	...	calm	40
14.	30.050	30.069	30.060	29.59	29.94	29.93	45.8	46.5	42.0	49	35	43	52	NNW.	...	...	calm	38
15.	29.974	29.994	29.844	29.48	29.82	29.82	43.2	43.8	40.4	48	38	43	52	NW.	...	...	W.	39
16.	30.042	30.283	30.019	29.65	30.10	30.28	42.4	43.0	42.0	42	35	42.5	44½	NNW.	...	...	calm	40
17.	30.282	30.300	30.279	29.90	30.26	30.26	39.8	40.6	37.3	47	39	38	51½	W.	...	...	calm	38
18.	30.174	30.218	30.143	29.75	30.20	30.20	41.7	45.7	39.2	46	39	45	50	NNW.	...	...	calm	39
19.	30.198	30.333	30.202	29.83	30.23	30.25	41.3	42.0	40.0	49	29	42	49	N.	...	...	var.	39
20.	30.318	30.399	30.319	29.87	30.27	30.37	41.3	41.8	36.4	52	29	42	48½	NNW.	...	...	calm	38
21.	30.412	30.443	30.432	30.1	30.43	30.32	37.7	39.3	32.6	46	25	34	44	N.	...	...	N.	37
22.	30.310	30.346	30.154	29.86	30.16	30.00	39.7	40.6	32.0	50	34	40	46	NW.	...	...	NW.	31
23.	29.998	30.202	30.032	29.60	30.12	30.25	39.0	46.4	37.4	50	30	37	43	NW.	...	...	calm	33
24.	30.152	30.235	30.175	29.80	30.27	30.33	36.7	38.2	33.0	43	30	34	38	NW.	...	...	calm	37
25.	30.298	30.384	30.317	29.81	30.34	30.33	37.4	41.0	32.0	44	26	36.5	42½	N. var.	...	...	N.	32
26.	30.324	30.362	30.237	29.93	30.32	30.22	35.3	40.3	30.9	40	31	35	45	NNW.	...	...	NNW.	29
27.	30.124	30.165	30.150	29.84	30.20	30.18	37.4	38.2	34.0	41	34	38.5	46	NW.	...	...	calm	30
28.	30.116	30.155	29.957	29.78	30.05	29.87	38.7	39.5	35.8	42	36	38	50	N.	...	...	NNE.	32
29.	29.788	29.858	29.827	29.40	29.67	29.66	39.5	42.0	38.2	50	34	42	55	N.	...	...	calm	32
30.	29.894	29.930	29.892	29.36	29.73	29.70	46.7	48.3	38.2	54	43	44	44	W.	...	...	S.	33
31.	29.840	29.866	29.823	29.43	29.61	29.55	46.8	47.6	45.2	47	42	47	49½	s.	...	...	calm	36
Mean.	30.248	30.315	30.231	29.86	30.217	30.208	39.7	41.7	35.9	44.87	31.35	39.0	46.7	NNW.	Sum, 2.1	0.28	.70	WSW.	Mean, 33.5



Fig. 1.



Fig. 2.



Fig. 3.

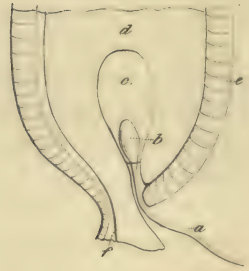


Fig. 4.

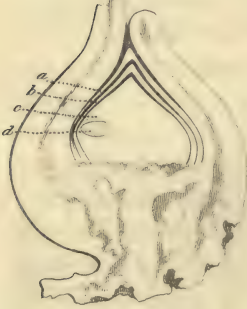


Fig. 5.



Fig. 6.



Fig. 7.

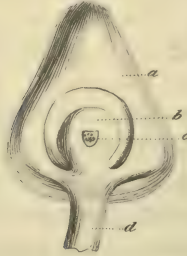


Fig. 8.



ANNALS OF NATURAL HISTORY.

XXV.—*On the recent Doctrines of Vegetable Embryology.*

By HERBERT GIRAUD, Member of the Council of the Botanical Society of Edinburgh, Ext. Mem. Med. Soc. Edin.

[With a Plate.]

NOTWITHSTANDING the rapid progress which has of late been made in developing the phænomena attendant on the reproduction of plants, still the true theory of phanerogamic embryology has not yet been fully established. The discoveries of Amici, Brown, and Brongniart, proceeding so far in advance of the old doctrines of Kælreuter, Gärtner and Linnæus, gave, as it were, a fresh impulse to the inquiry regarding the intimate nature of the origin and development of the embryo in flowering plants; hence, in this country, but more particularly on the continent, this subject has been prosecuted with considerable zeal and activity; and it has certainly received much elucidation by the disclosure of phænomena hitherto little suspected. Still, however, the statements of some of the most eminent of the continental phytologists are of a very opposite nature, and the hypotheses to which they would justly lead, are still more widely discrepant. I here allude to the very discordant opinions, regarding the origin of the embryo, entertained by Schleiden, Wydler, and many of the German botanists on the one hand, and the views maintained by Mirbel, Spach, and Brongniart on the other.

The facts and doctrines advanced by Schleiden and his followers have been made known to British botanists chiefly through the medium of a translation by Dr. Wood of Bristol, published in the L. and Ed. Philosophical Magazine for March 1838; as, however, some of the readers of this paper may not yet be aware of the views of Schleiden, I will venture shortly to detail them; that a general view may be taken of the disputed points and of the question as it at present stands. According

to this observer*, at a very early period of the development of the ovule, a cellule from the interior of the nucleus, which originally differed not from the surrounding ones, is developed to an extraordinary degree, and presses more or less on the surrounding tissue of the nucleus, which is then absorbed from within outwards. This cellule is the embryo-sac (*membrana amnii*, Malpighi; *sac-embryonnaire*, Brongniart; *quintine*, Mirbel) which exists in all phanerogamic plants without exception, even before impregnation. This embryo-sac contains a substance which is gradually transformed into cellular tissue; and being ultimately developed within the embryo-sac, forms (when not absorbed by the growth of the embryo) the endosperm, or albumen of most authors. The pollen tube, having made its way through the conducting tissue of the stigma, and having reached the ovule, penetrates the aperture in the teguments, traverses the summit of the nucleus, and following the intercellular passages arrives at the embryo-sac. Having reached this point the pollen tube presses before it the membrane of the embryo-sac, which is then folded all around it; so that the extremity of the pollen tube appears to penetrate into the sac; though in reality it is on the outside of it. (Pl. IV. fig. 1. and 2.) Thus inclosed the extremity of the pollen tube enlarges into the form of an oval spheroid, and its contents are converted into cellular tissue; at its sides are formed the lateral organs or cotyledons, from which the extremity remains distinct and is developed into the plumule. The portion of the tube situated above the embryo, and which is embraced by a duplicature of the embryo-sac, is gradually but completely obliterated; so that the embryo is then left free within its sac. In this way the embryo is formed of two membranes;—the indented embryo-sac and the membrane of the pollen tube. (Fig. 2.) With these statements of Schleiden the still more recent observations of Wydler† agree, except as regards the folding in of the embryo-sac, which this last observer has never met with; but it appeared to him

* Schleiden, Sur la formation de l'ovule, et l'origine de l'embryon dans les Phanerogames, Ann. des Scien. Nat. 2nde Série. Botan. Mars, 1839.

† Wydler, Note sur la formation de l'embryon (Extrait d'une lettre de M. Wydler, professeur à Berne, communiqué par M. A. St. Hilaire à l'Académie des Sciences à Paris, Oct. 1838.)

that the cavity of the sac elongated itself, under the form of a straight canal, even to the summit of the ovule, and there opened in the endostome and received the extremity of the pollen tube.

If the truth of these observations be admitted, two very obvious conclusions will result. 1st. Our notions regarding the functions of what are called the male and female organs (stamens and pistils) must be materially altered, and the sexes of the two sets of organs respectively exchanged; the anther must be considered as a female ovarium, and each pollen grain as the germ of a new organism, being determined in its development by the secretions of the embryo-sac; this last structure therefore must be held to correspond with the male organ. 2nd. The process described by Schleiden obviously establishes a close analogy in the development of the embryo between the phanerogamia and those cryptogamia in which the sporules appear to be conversions of the cellular tissue of the foliaceous organs; for the same part in both furnishes the groundwork of the new plant in each group.

It has been conceived by Dr. Carpenter* that it is not the extremity of the pollen tube, but one of the pollen granules transmitted along the tube, which is ultimately developed into the embryo, and that hence a still more intimate analogy may be instituted between the reproductive organs of flowering and those of flowerless plants; a precisely similar function being performed by the theca and the anther, and by the spore and the pollen grain. These doctrines, so deeply affecting some of the most generally received opinions regarding the reproduction of flowering plants, have not passed without the critical investigations of other observers, but have incited MM. Mirbel and Spach to enter on a series of inquiries undertaken for the express purpose of testing the accuracy of the statements of Schleiden and Wydler. As far as I am aware, these observations have not yet been published, and are little known in this country; they were conducted with the view of ascertaining the intimate nature of the develop-

* Carpenter, Dr. W. B., *Principles of General and Comparative Physiology*.

ment of the embryo in *Zea Mays*. The following are the results which were obtained, arranged, as by Mirbel and Spach, under seven general heads, corresponding with the progressive periods of the growth of the female organs*.

First Period.—The origin of the female spike of the *Zea Mays*, like that of all the external organs of plants, commences in a simple excrescence of cellular tissue, invisible to the naked eye. As it advances in age, this excrescence enlarges, elongates, becomes conical, and is studded partially from base to apex with little projections, which separately give origin to others. Each group of mammillary projections is the germ of a future flower; but seldom more than one becomes developed in each group, the rest being abortive. The remaining one, or that which is ultimately formed into a flower, produces at its circumference little thin cushions of tissue (bourrelets) in the form of rims, some of which form complete circles, others only semicircles; all however being concentric. Each of these little margins is quickly transformed into either a bract, a glume, a carpel, an ovary, or the integument of an ovule, according to the relative position which it occupies. The apex of the mammillary projection constitutes at this period the nucleus of the ovule.

Second Period.—The ovarium has now the form of a small cup with a large orifice, and its parietes consist of a thin and transparent membrane. The nucleus is fixed to the base of the ovarium;—an arrangement which is constant in the *Mays*. The primine and secundine proceed from the circumference of the nucleus, which they partly inclose. The first of these envelopes being much shorter than the other, surrounds the nucleus only at its base; hence it follows that the endostome sensibly extends beyond the exostome.

Third Period.—The style, of which, up to this period, there was not the least appearance, arises from that side of the ovarium which is nearest to the axis of the spike; as it elongates it assumes the form of a straight lamina of tissue. The ovule with its two membranes,—the primine and secundine, has

* Notes pour servir à l'Histoire de l'embryologie végétale. Par MM. Mirbel et Spach, Ann. des Scien. Nat. 2nde Série, Botan. Avril 1839.

now changed its position ; its axis was at first parallel with that of the spike ; but it is now inclined at an angle of about 45° . The secundine is still in advance of the primine.

Fourth Period.—The ovary is now of a rounded form, having its orifice narrowed into a kind of canal. The style continues to enlarge, and has its upper extremity terminated by two dentitions, more or less distinct, which may be considered as constituting a double stigma. The axis of the ovule now makes an angle of 90° or 100° with that of the ovarium, but coincides with that of the nucleus, at the apex of which it terminates. Very near this point, in the interior of the nucleus, there appears a small ovoid cavity, which contains a transparent mucous matter, first pointed out by Schleiden. (Fig. 4 *d*.) In the same ratio as the axis of the ovule inclines from that of the spike, do these portions of the primine and secundine, which lie on the opposite side, increase in size and elongate ; while those portions which are attached to the side next the axis of the spike remain almost stationary in their development : from both these envelopes a process extends into the canal leading from the ovarium.

Fifth Period.—The ovarium continues to enlarge and the style to elongate ; in the latter may be observed, as Brongniart first noticed, two bundles of tubes, which, after running together for a short distance, divide and pass off to each side of the ovarium, and continuing in a parallel direction, are ultimately lost in the dentiform projections which constitute the stigma. At this period the ovule is inclined at an angle of from 125° to 135° . The mucilage of the little cavity situated at the apex of the nucleus disappears ; and at the same point may be distinctly seen a large ovoid, diaphanous utricle, which fills and lines the cavity. (Fig. 5 *a*.) This utricle is called by Mirbel the primary utricle. The fact of such an organ being formed, and of its having acquired a sensible progress in growth, before the period of impregnation, is of the greatest importance with reference to the views of Schleiden ; this utricle is what is described by that observer as “l'extrémité antérieure du boyau pollenique.” It is surrounded by a thin projection, upon which are attached small spiral vesicles, arranged in close clusters ; and it is terminated at its inferior

extremity by a filiform tubular appendage, projecting at the endostome, and called by Mirbel the suspensor. This last organ is considered by Schleiden to be a portion of the pollen tube.

This early formation of the primary utricle, which may be considered as the first outline of the embryo, has been proved by Mirbel and Spach in a large number of the Gramineæ;—in all those, in fact, which they have examined.

Sixth Period.—Immediately after its first appearance the primary utricle contains a fluid opaque matter, in which however may be perceived an organized substance composed of globules having each a small central cavity; it is called by Mirbel “Globulo-cellular cambium.” This substance soon transforms itself into a mass of membranous tissue, which becomes moulded to the cavity of the primary utricle and its suspensor; this last organ now sensibly elongates and enlarges. (Fig. 6.)

Seventh Period.—It now becomes evident that the primary utricle, and the cellular tissue with which its cavity is filled, constitute the first trace of an embryo, which now enlarges at its thickest part, and elongates into a cellular lanceolate point; this is the lamina of the seminal leaf (hypoblaste, A. Richard; carnade, H. de Cassini), the inferior surface of which is in relation with the interior of the ovule, the superior with the axis of the spike; at its base is the radicle, terminated by an empty, flaccid, lacerated tube,—the last vestige of the suspensor, which has gradually been absorbed. Upon the upper surface of the lamina, immediately above the point at which it unites with the radicle, there is formed a projection or swelling of the tissue, which is the commencement of the plumule; it soon extends itself, and becomes imbedded in a kind of hood, in the cavity of which the first rudiments of the stem leaves make their appearance. The edges of this little hood gradually approach each other, unite, and form a kind of pouch* (cotyledon, A. Richard and H. de Cassini). (Fig. 7. and 8.)

* Schleiden has of late imagined that this pouch represents the ligule of the cotyledon leaf;—an hypothesis which, though at first sight very attractive, loses all its probability as soon as germination commences; for then the pedicel, which always takes its origin above the point of the attachment of the cotyledon leaf, is seen to elongate, and to bear up with it the little

In tracing out the development of the embryo in others of the Gramineæ, MM. Mirbel and Spach found the phænomena presented by each species to be so closely similar, that the embryogeny of the *Zea Mays* may justly be considered as the type of this process as carried on in all the Gramineæ: still however a few modifications of minor importance were disclosed; thus, in the *Zea Mays*, the *Euchlæna mexicana*, the *Coix Lacryma*, and in *Tripsacum hermaphroditum* the ovule remains attached to the base of the cavity of the ovarium, however advanced the period of development may be; but in *Sorgham vulgare* and *Melica nutans* the attachment of the ovule is so displaced that this body is found fixed to that internal portion of the wall of the cavity of the ovary which corresponds to its anterior surface. Again, in *Zea Mays*, and in *Euchlæna mexicana*, the apex of the ovule is inclined, and, as it begins to approach its base, the primine completely covers the secundine. About the same period those parts of the two envelopes which correspond with the orifice of the ovary, elongate into two empty points, of which one is inclosed within the other. Lastly, the primary utricle in *Euchlæna* differs from that of *Zea* and *Sorgham*, resembling a little crooked cone, the base of which is rounded; and the suspensor, which in *Sorgham* and *Zea* arises from the base of the utricle, and elongates itself in the direction of the axis to arrive at the exostome, arises in this instance from the side of the utricle, a little above its base; and in elongating towards the exostome it follows an oblique direction.

On comparing the observations of Schleiden and Wydler with those of Mirbel and Spach, which we have just stated in detail, a striking and essential difference is clearly perceptible between the conclusions to which these observations respectively lead, at the same time that a wide distinction is indicated between the doctrines necessarily flowing from each. In instituting a comparison between the conditions of the ovule and embryo during the progress of their development as stated by these observers, it will be found, that the parti-

pouch with which it is surrounded. Hence we obtain a proof that this organ has nothing in common with the ligula.

cular points upon which they do not agree, and with regard to which the statements of Mirbel and Spach would appear to controvert the views of Schleiden, may be ranged under three general heads, corresponding with as many stages of the development of the female organs.

1st. Schleiden maintains that when the axis of the ovule makes an angle of about 90° with that of the style, an oval cavity, containing a limpid mucous fluid, (cambium, Mirbel,), is discovered near the apex of the nucleus; that the formation of this cavity is contemporaneous with that of the embryo-sac (quintine, Mirbel; sac-embryonnaire, Brongniart,), which soon makes its appearance, gradually increases, and becoming filled with a cellular substance, occupies a considerable space in the nucleus. Now in opposition to this, M. Mirbel's investigations have shown, that the little cavity, which is always fixed to the apex of the nucleus, does not become enlarged during the growth of the ovule; but that its fluid contents soon contribute to the formation of the primary utricle.

2nd. It is asserted by Schleiden, that when the oval cavity enlarges and the embryo-sac is correspondingly developed, the tube issuing from the pollen grain penetrates to the summit of the nucleus, pressing before it the membrane of the embryo-sac, which, yielding to its pressure, forms a cæcum in which the extremity of the tube is lodged. This view is opposed by the statements of Mirbel, who has shown that in many species of plants, and particularly in the Gramineæ, the embryo-sac is wanting; and that in these cases the primary utricle takes its origin from the fluid matter (cambium) of the little cavity of the nucleus; so that this last may be wholly destitute of a lining membrane, such as Schleiden would make the embryo-sac. But even supposing that this part existed and underwent the changes conceived by Schleiden, and that a portion of the embryo-sac was expanded into a cæcum serving as a sheath for the extremity of the pollen tube, it would follow that from the translucency of the parts, the existence of two membranous expansions (the pollen tube and the embryo-sac) might readily be determined; but both Mirbel and Wydler have only succeeded in detecting one; that, namely, which

Schleiden takes for the extremity of the pollen tube. Again, if the membranous sac or primary utricle of Mirbel be only the extremity of the pollen tube, it would occur that, during the first formation of that utricle, the posterior part of the tube would show itself externally to the nucleus; but Mirbel has shown that the utricle originates in the cavity of the nucleus, and for a long time is wholly lodged there, giving no indications externally of its presence. A fact which appears to strike at the very foundation of Schleiden's statements is, that at the period when the observations of MM. Mirbel and Spach were made, impregnation could not possibly have taken place, for the female organs of the *Zea* were entirely covered by from seven to ten broad bracteæ, all closely infolded within each other; so that under this disposition of parts it was impossible that the pollen tubes could arrive at their destination.

3rd. Schleiden states that the part of the pollen tube lodged in the cæcum of the embryo-sac becomes club-shaped, and in its cavity is produced a mass of utricular tissue, with which it becomes filled; whilst the posterior part of the tube still continues in its original membranous condition; that portion soon disappears, while the extremity of the tube becomes transformed into the embryo, and commences a new development. Now M. Mirbel has shown that the first appearance of the primary utricle precedes the application of the pollen; that it is independently engendered in the ovule; and that, conjointly with the utricles which it produces, it commences the formation of the embryo. The same observer has moreover stated that the flaccid membranous tube by which the young radicle terminates, is not the posterior part of the pollen tube, but the suspensor, or appendage of the primary utricle, of which it evidently forms a part, as its elongation takes place from within outwards, and not from without inwards.

The refutation of the doctrines of the German phytologists, thus apparently afforded by the observations of MM. Mirbel and Spach, would serve to establish the generally received opinions regarding the sexual functions of the reproductive organs of flowering plants, and to maintain the present views

of the nature of phanerogamic generation; for certainly the investigations of these latter observers lay more claim to our confidence than those of Schleiden, from their having been conducted with greater care, and in a regular chronological order*. But with reference to this question, I believe that an induction may be drawn from a source, which, whilst it is derived from the most universal law of the development of plants, is free from those errors which will ever be found to creep into microscopical investigations, even when conducted by the most skillful hands.

From the recent additions which have been made to our knowledge regarding the morphology of the reproductive organs, I think it may be shown, that a consideration of the morphological conditions of the ovule and embryo, independent of arguments founded on any other grounds, would lead to the conclusion—that the embryo is originally a body foreign to the ovule, and introduced into it from without—a view corroborative of the opinions of Schleiden.

Most authors make four great stages in the morphology of the sexual system;—viz. the whorl of the calyx, corolla, stamens, and pistil. I think, however, we may make five or even six, by including what I believe to be leaf formations of the ovule. According to these authors, the upper and last stage of metamorphosis is that of the fruit-leaf (carpellary leaf), which, in each of its three dimensions, is changed in a peculiar way. But does the axis terminate with this carpellary whorl of leaf metamorphosis? Von Martius† is of opinion that the axile formation is terminated by the receptacle, upon which the fruit-leaf is situated; so that the elongation of the axis is herewith at an end. M. Mohl, found-

* The very anomalous phenomena attendant on the embryogeny of *Santalum album* (so accurately described by Mr. Griffith in the Linn. Trans. vol. xviii. Part I.) are equally opposed to the views of Schleiden; for in no case could Mr. G. perceive the membrane of the embryo-sac either pierced or depressed by the pollen tubes. And, in the cases of *Loranthus* and *Viscum*, he found that the formation of the ovule was a process subsequent to impregnation;—an observation at total variance with the idea that the ovule or female organ is a nidus adapted to the development of an embryo, supposed to be derived entirely and directly from the male.

† M. Von Martius, Die Metamorphose der Pflanzen, 1837.

ing, as I suppose, his opinion on the production of buds on the leaves of *Bryophyllum* and *Malaxis paludosa*, concludes that the ovules always spring from the upper surface and margins of a carpel leaf, and that they are wholly unconnected with the axis, which, as he supposes, has no share in the formation of the ovarium. Certainly the position of the ovules on the edges of the carpellary leaves in *Papaver* and others, or at the sides of the midribs in *Viola*, &c. would appear to favour these opinions.

Professor Meyen* believes that the origin of the ovules is fourfold; that they originate most frequently at the margins of the carpellary leaves; next, at the sides of the midribs of the carpel leaves; and lastly, from the axis, where they occur either at the end of the axile formation, or at the side of the frequently much shortened axis. The facts, however, from which these statements are deduced, may be explained upon the supposition that the ovule is an axile formation; and if the ovula be considered as analogous to buds, they will fall in with that very general law—that a bud is never formed on a leaf, but from the axis or its derivative organs alone. The case of *Bryophyllum* alone offers a real exception to this view.

MM. Henry and Marquart† have represented the carpellary leaves separated from the axis and forming stamens, while nevertheless the axile formation produced ovules; than which no better proof can be afforded of the elongation of the axis. The most obvious conclusion regarding the nature of the true *Placenta centralis libera* is that it is a prolongation of the axis, as in the *Polygoneæ* and in *Taxus*; and Schleiden, who coincides in this view, enumerates several examples which tend to prove its correctness; such as the condition of the ovaria of the *Fumariaceæ* and *Cruciferaæ*, and of the cones of the *Coniferaæ*. Von Martius states that the reproductive organs produce axes of peculiar

* Report on the Progress of Vegetable Physiology during the year 1837. By F. J. F. Meyen, M.D. Translated by William Francis. Lond. 1839.

† Ueber abnorme Bildungen des Fruchtknotens der *Salix cinerea*, L. mit einer Tafel Abbildungen. Ersten Jahresbericht des Botanischen Vereines am Mittel- und Niederrhein. Bonn, 1837.

structure, (meaning the ovules with their embryos,) which separate from the primitive axis, and commence an independent life; but it is impossible to reconcile this with his former statement—that the axis terminates at the receptacle. If it be conceded that the axis is prolonged into the ovarium, and has its share in the formation of the placenta, then may we conclude that the ovule itself is an axile formation, and that it is in all respects analogous to a leaf-bud; hence the ovular membranes, inclosing the nucleus, must be collateral, or true leaf formations. The correctness of this view may be moreover established on the following grounds. The primine and secundine, at a very early period of their development, are not presented each as a continuous membrane encircling the nucleus, but they consist of several portions, forming two whorls of what I would term ovular leaves, their internode being wanting; its normal position being occupied by a portion of tissue near the chalaza. This opinion is also supported by the instances which have been noticed of the descending metamorphosis of the ovule. MM. Henry and Marquart have noticed the retrograde or descending metamorphosis in the ovules of the *Salix cinerea*, and have represented, in drawing, a catkin, the carpels of which were filled with a number of longitudinally folded leaflets occupying the normal situation of the ovules; doubtless these were the organs which should have constituted the ovular membranes. Hence then it may be concluded that the axis has its termination at some point within the ovule; this I would consider to be situated at the chalaza; here, the vessels which have ascended through the woody tissues of the stem, and have penetrated the cellular structure of the placenta, are suddenly stopped, as it were, in their course, and are spread out in ramifications to the nucleus and its tegumentary membranes; thus forming the true organic placenta.

It has been asserted by Turpin* that the axis has its ter-

* Esquisse d'Organographie Végétale, fondée sur la principe d'unité et de composition organique et d'évolution rayonnante ou centrifuge, pour servir à prouver l'identité des organes appendiculaires des végétaux, et la metamorphose des plantes de Goethe. Paris, 1837.

mination in the embryo; in which case, according to the general laws of vegetation, the embryo should be continuous, at its organic base, with the organic base of the ovule; and consequently the radicle should be turned towards the chalaza, that is to say, next the point where the ovular leaves (membranes) are connected; for in this way only can an organic continuity be established between the female parent plant and the embryo. But if the normal position of the embryo, with regard to the axis of the ovule, be considered, it will appear that in all these respects an opposite arrangement is presented; so that the organic base of the embryo (the radicle) is diametrically opposite to the organic base of the ovule (the chalaza), and is directed towards the micropyle. From this it is evident that the embryo cannot be considered as the product of metamorphosis within the ovule; that it has not taken its origin in the interior of that organ, but has been introduced into it from without, that it may attain a degree of development fitting it hereafter to live as an independent axis.

If this view be admitted, the doctrines of Schleiden will receive a confirmation, which must entitle them to more consideration than they would otherwise have merited, with the statements of Mirbel and Spach weighing so heavily against them; for the position which we have here maintained, on morphological grounds, is not liable to have its foundations shaken by those objections which may be raised against the observations both of Schleiden and of his opponents, from the well-known inaccuracies and deceptions which are attendant on microscopical investigations, however carefully conducted.

While then the accurate statements of Mirbel and Spach would appear to prove undoubtedly that the impregnation of the ovule is not required for the primary engendering of the first traces of the embryo, (which, if proved, would completely falsify the views of Schleiden and of Dr. Carpenter,) the morphological condition of that structure compels us to admit the high degree of probability which may be attached to the idea—that the embryo is a body origin-

ally foreign to the ovule, and introduced into it from without.

EXPLANATION OF PLATE IV.

Fig. 1. Part of the ovule and conducting tissue of *Phytolacca decandra*. *a.* Conducting tissue. *b.* Pollen tube. *c.* Embryo. *d.* Embryo-sac. *e.* Nucleus. *f.* Secundine. *g.* Primine. (Schleiden.)

Fig. 2. The extremity of the pollen tube (embryo) indenting the embryo-sac. *a.* Pollen tube. *b.* Embryo. *c.* Embryo-sac. (Schleiden.)

Fig. 3. The inferior part of an ovule of *Carduus nutans*, after impregnation. *a.* Pollen tube. *b.* Embryo. *c.* Embryo-sac. *d.* Nucleus. *e.* Teguments. (Schleiden.)

Fig. 4. Section of the ovarium of *Zea Mays* at an early period of its development. *a.* Primine. *b.* Secundine. *c.* Nucleus. *d.* The little cavity in which the primary utricle is afterwards formed. (Mirbel and Spach.)

Fig. 5. The same at a more advanced period. *a.* The primary utricle. (Mirbel and Spach.)

Fig. 6. The primary utricle, detached from the ovule, filled with the globulo-cellular cambium. (Mirbel and Spach.)

Fig. 7. The embryo detached. *a.* Cotyledon. *b.* The first leaf of the plumule. *c.* The second leaf of the plumule. (Mirbel and Spach.)

Fig. 8. The embryo at a more advanced period. *a.* The first leaf of the plumule. *b.* Radicle. *c.* The suspensor. (Mirbel and Spach.)

XXVI.—*Observations on the Family Helicidæ, and description of a new Genus.* By Dr. L. PFEIFFER of Cassel*.

THE most difficult question concerning the limits of genera among the land mollusca has of late been frequently treated of, and with widely different results. If, on the one hand, Férussac went much too far, in comprising nearly all air-breathing mollusca with four tentacula in his genus *Helix*, still, on the other hand, the attempts at a division of this large group have not yet succeeded in a satisfactory manner. Draparnaud's genera, however, form a good basis, to which I am inclined with slight deviation to return. Lamarck evidently relied too much on individual peculiarities of the shell, because he was not acquainted with a sufficient number of species in which the transitions of the forms may be distinctly

* From Wiegmann's Archiv, Part I. 1840.

demonstrated. This is especially the case with the genus *Achatina*, which had necessarily, in as far as its character was merely founded on the truncated columella, to be again united with *Bulimus*, as the animals, both as to their exterior as well as their anatomical characters, are perfectly similar, and all the intermediate forms may be followed, from the truncate columella of *Achat. virginica* to the beautiful round aperture of *Bul. hæmastomus*. But those species are excluded from this reunion which Montfort comprised in his genus *Polyphemus*, as these are not merely distinguished by the peculiar form of the columella, but likewise by the bilobate snout of the animal.

I follow therefore in general the well sustained view of Deshayes, who reunites the genera *Achatina* and *Bulimus* of Lamarck, and shows on anatomical grounds (Lam. viii. p. 14. 2de édit.) that they cannot be comprised under *Helix*; but I cannot at all agree in the opinion expressed by the same ingenious naturalist, that *Clausilia* and *Pupa* must likewise be combined. I find, rather, no reason for separating Draparnaud's genus *Pupa* from *Bulimus*. In the European species described by Draparnaud, there were, it is true, some constant characteristics evident which appeared to justify this separation; but with how many species have we since then become acquainted, which have shown the earlier generic characters to be insufficient, and have therefore been sometimes ascribed to the one, sometimes to the other of these genera! In fact, I know at present not a single distinctive character between the two. The animals are perfectly identical; the form is in both cylindrical or ovate; and the oral edge disconnected. What therefore is left? The form of the aperture, or its folds and teeth? The form of the columella? For all these characteristics the most distinct forms of transition are afforded by Férussac's genus *Partula* or Swainson's *Achatinella*. Are the teeth and folds of the aperture to constitute the chief character,—which for instance Menke seems to adopt, since he refers to the *Pupæ*, the long-known *Bulimus Pupa*? But how many toothed species do we not now refer without scruple to *Bulimus*, following the analogy with *Helix*, while at the same time we do not class, for instance, *Pupa obtusa* among them! In the ex-

ceedingly difficult group of the large extra-European forms, the teeth of the aperture and the folds of the columella are a very uncertain character; sometimes they are present, sometimes missing: *Pupa sulcata* is perfectly toothless. On the other hand, the great affinity of this group with *Bulimus labiosus**, Br. is evident, and this can just as little be separated from *Bulimus faba*, Desh. (*Partula australis*, Fér.) as the latter from *Bul. ægotis*, Mke. (*Auricula Sileni*, Lam.) *Bulimus citrinus* and the other true species of *Bulimus* (according to Draparnaud!). Indeed the most certain proof of a genus having been falsely established is when several of its species are thrown from one to another; or generally when we are uncertain to which any species that occurs is to be carried.

From all these reasons I consider that the genus *Pupa*, Dr., must be wholly discarded, and its species arranged with *Bulimus*. But the genus *Clausilia*, according to its old Draparnaudian characteristic, remains firm. Did there exist no other distinctive character, the clausium—a part evidently analogous to the operculum of several molluscous genera—would alone suffice to establish the genus; and if we define this with Draparnaud's short words thus: "*Testa fusiformis; peristoma continuum oblongum; clausilium!*" we have a well-defined whole. It is true, a portion of the species included by Draparnaud in this genus, to suit which Lamarck (ed. Desh. viii. p. 195.) says, *Ce nom fut d'abord significatif!* must then be excluded; viz. 1°, all those which have no continuous peristoma; and 2°, those which have a circular continuous peristoma but possess no clausium. Of the former I will merely mention the *Clausilia exesa*, Spix (Desh. No. 39.), and Turton's *Balea fragilis*, which indeed is reckoned by Draparnaud, Nilsson, and Lamarck as a *Pupa*; but by Studer, C. Pfeiffer (vol. iii.), and Menke as a *Clausilia*. Both must range, together with the genus *Pupa*, under *Bulimus*. To the second section belong Lamarck's

* Desh. No. 130. This beautiful species, adopted by Deshayes only from Müller's excellent description, is in my possession. It is represented with perfect truth in Chemnitz (ix. p. 1234.), but the figure in Gualtieri (T. 4. R.) cited with a query has no relation to it, but belongs to the species which Blainville (Malacol. tab. 39. fig. 5 a.) has figured as *Pupa Mumia*.

and Deshayes' species, Nos. 2, 9, 40, 41, 42, 43. But since all these, on account of the regularly continuous peristoma, can be classed with none of the other genera of the family *Helicidae*, and on account of the structure of the animal can far less be referred anywhere else, I conceive that they form of themselves a good genus, and propose for this the name *Cylindrella*,—a name which in the first place points to the form of all the species known, modified by the termination already in use in molluscous genera.

The characteristic of this new genus would be as follows:—

CYLINDRELLA, *L. Pfr.*—Animal heliciforme. Testa subcylindracea, imperforata, multispirata, sæpe truncata. Peristoma continuum, suborbiculare. Operculum vel clausium nullum.

All hitherto known species are inhabitants of the West Indian Islands, and I myself have found in Cuba four evidently distinct species, of which two have already been described and figured by Férussac (*Helix Cochlodina perplicata* and *subula*), the two others are perhaps new. The latter have been preliminarily described by me in Wiegmann's Archiv (1839, p.353.) under the name *Clausilia elegans* and *crispula*. It appears remarkable to me that all the Cuban *Cyclostomata* with which I am acquainted are always truncate, i. e. cast off the apex at a certain age, and reclose the open place. Almost all known species are dextral, and we should be justified in adopting this as a generic character if Chemnitz's *Turbo elongatus* from Jamaica (*Clausilia Chemnitziana*, Desh.) was not sinistrously whorled, according to the figure and clear description. (Chemn. ix. fig. 956.) In other respects this species is so nearly allied to my *Cyl. elegans* in its habit, that we may admit with certainty that it likewise has no clausium, and belongs to the new genus, of which the following are the hitherto known species:—

1. *Cylindrella gracilicollis* (*Clausilia truncatula*, Lam. 2.)
2. ——— *collaris* (*Claus. collaris*, Lam. 9.)
3. ——— *antiperversa* (*Claus. antiperversa*, Desh. 40.)
4. ——— *subula* (*Claus. subula*, Desh. 41.)
5. ——— *perplicata* (*Claus. perplicata*, Desh. 42.)
6. ——— *Chemnitziana* (*Claus. Chemnitziana*, Desh. 43.)

- | | |
|-------------------------------|---|
| 7. <i>Cylindrella elegans</i> | } Clausilia, <i>L. Pfeiffer</i> in Wiegmann's |
| 8. ——— <i>crispula</i> | |
| 9. ———? <i>torticollis</i> | (Claus. <i>torticollis</i> , <i>Lam.</i> 1.) |

The first five of these species are figured by Férussac on the 163rd plate, and are referred by him to the subgenus *Cochlodina*. Rossmässler calls them, ('Iconographie', Part II. p. 13.) "long-necked *Pupæ*," under which Sowerby ('Genera of Shells,') also classes some species belonging here. Whether *Clausilia torticollis*, *Lam.* from Candia, must likewise be referred to *Clausilia* I will not venture to determine, as I am not acquainted with the species, nor is the figure at present at my disposal, and the description is slight, especially with reference to the aperture. Yet much speaks in favour of this being its true position.

From what has been above stated it appears to me advantageous to divide the family of the *Helicidæ* into the following genera:—

1. *Vitrina*.
2. *Helicophanta*.
3. *Succinea*.
4. *Helix* (with *Carocolla* and *Anostoma*, *Lam.*)
5. *Bulimus* (with *Achatina*, *Lam.*, *Pupa*, *Drap.*, *Partula*, *Fér.*, and *Megaspira*, *Lea.*)
6. *Vertigo*.
7. *Cylindrella*.
8. *Clausilium*.
9. *Polyphemus*, *Mont.*

The character which all have in common with the *Limacidæ*, and by which they are distinguished from the following orders, are the retractile tentacles provided at the apex with eyes; and the separate genera appear to me only in this way capable of being sufficiently established according to correct principles. Perhaps, however, some changes must be made in accordance with the structure of the animals, as I am chiefly led to suppose from some observations made on living specimens of *Bulimus hæmastomus*.

XXVII.—*Some Remarks on the foregoing Paper of Dr. L. Pfeiffer, especially on the Clausium of Clausilia.* By JOHN EDWARD GRAY, F.R.S. Keeper of the Zoological Collection in the British Museum.

To the Editors of the Annals of Natural History.

DEAR SIRS,—I have read Dr. L. Pfeiffer's paper with great interest, though, as you will perceive by the following remarks, I differ from him in some particulars, as I consider he has just been doing what he blames others for, that is, attempting to establish a genus which when examined by his own views will not stand. The genus which he describes has been long known to English conchologists under the designation of *Brachypus*, of the late Rev. Lansdown Guilding, but finding this name preoccupied, he afterwards changed it to *Siphonostoma*. It will be found characterized under the latter name in Mr. Swainson's volume of Lardner's Cyclopædia, p. 168, f. 22, and 333, f. 97, d and e, where the *Clausilia collaris* of Lam. = *Turbo truncatulus*, Wood's Cat. Supp. f. 27, a species first figured by Lister, is called *Siphonostoma costata**. I have long separated the group in my cabinet; but Dr. L. Pfeiffer appears to have overlooked one of the most essential characters of the genus, namely that there is always a slight groove in front of the mouth of the shell, forming a ridge or keel on the front of the last whorl, as in *Clausilia*. This groove appears to have given rise to Guilding's latter name of the genus.

I do not consider this natural and geographical group, which is only established on conchological characters, as more distinct in the family of Helicidæ, than all those genera which Dr. L. Pfeiffer in this paper proposes to get rid of, as for example *Anastoma*, *Achatina*, *Pupa*, *Balea*, *Partula*, *Megaspira*, and *Achatinella*, which are all equally natural and groups of confined geographical distribution. If such groups are to be used as genera all the above-named must be retained, and many more established, and at the same time I consider they are all much more distinct from each other than *Vertigo* is

* *costatum*.

from *Pupa*, which the author of the paper is willing to consider a distinct genus of the same rank as his *Cylindrella*.

There are several other species referable to this group, besides those named by Dr. Pfeiffer; among others, a very large and beautiful one, the giant of the genus, named *Pupa purpurea* by the English authors, which has a very slender tapering tip about an inch long, and then the whorl suddenly enlarges and forms a broad ovate shell; the top which held the body of the animal in its young state being far too small for its rapidly increased size, falls off and leaves a blunt end.

A second species nearly as large is *Helix Maugeræ* of Wood, Cat. Sup. t. 7. f. 31. = *Helix ignifera*, Férussac, n. 494.

If the shell which I possess under the name of *Clausilia torticollis* is correctly named, it is a true *Clausilia*.

I cannot agree with Dr. L. Pfeiffer in regarding the clausium of *Clausilia* as "evidently analogous to the operculum of several molluscos genera." First, It is not attached to the animal as the operculum always is, but is a mere appendage to the mouth of the shell. Secondly, It is only formed when the animal has nearly reached its full growth, when it is about to complete the mouth of its shell, and not developed in the embryo of the animal while yet in the egg, as is the case with the operculum. Thirdly, The genus belongs to a group of molluscos animals which are never operculated.

From the above considerations I have always regarded the clausium as a peculiar modification of a tooth or plait; I think, that when its position, use, and mode of formation is considered, this will be found to be the case. If this be correct, I do not then see how the genus *Clausilia* is to be separated according to Dr. L. Pfeiffer's views from *Bulimus*; and as *Cylindrella Chemnitziana* has the ovate mouth, and the sinistral whorls of *Clausilia*, and I believe a rudimentary clausium, it will be necessary, if his views are carried out, to unite his genus *Cylindrella* to the same great group.

Yours very truly,

JOHN EDWARD GRAY.

British Museum, May 14, 1840.

XXVIII.—*Additions to the Fauna of Ireland*. By W. THOMPSON, Esq., Vice-Pres. Nat. Hist. Society of Belfast.

[Continued from p. 14.]

MOLLUSCA*.

Scalaria Trevelyan, Leach. MS. Several years ago I was favoured with specimens of this handsome shell from the coast of the county of Cork by Mr. John Humphreys. Like many other British mollusca long known to naturalists it still remains undescribed, but it is not for me to attempt its description. I learn from Mr. Alder that it was discovered many years ago on the coast of Northumberland by Miss Emma Trevelyan, in honour of whom it is named.

ECHINODERMATA.

Asterias aurantiaca, Linn. Youghal, Mr. R. Ball; coasts of Down and Antrim, W. T.; Ross bay and south-west coast of Cork, common, Mr. G. J. Allman.

† *Asterina gibbosa*, Forb. Wern. Mem. vol. viii. part 1.

Asterias gibbosa, Penn. Coasts of Down, Antrim, and Dublin, W. T.; Southern and western shores, Mr. R. Ball.

Linkia rosea, mihi.

Asterias rosea, Mull. Zool. Dan. vol. ii. p. 35. tab. 67. In Mr. R. Ball's collection, I have seen two specimens of this star-fish, which is an addition to the British Fauna—they were obtained

* *Trochus millegranus*, Philippi, Enum. Moll. Siciliæ, p. 183. tab. 10. f. 25. This species has been in my collection for some years from the northern and southern localities of Strangford lough and Bantry bay. Mr. Forbes informs me that it is to this *Trochus* the name of *T. Martini* is applied in Mr. Smith's paper lately published in the Wernerian Memoirs (vol. viii. Part I.). It is there stated that Mr. Alder found the species at Dublin; but I understand that the Irish specimens thus alluded to were not from that locality, but from the one first mentioned here. Mr. Humphreys of Cork, from whom I had the Bantry bay specimen in 1835, stated that Dr. Turton had named it *T. conuloides*.

† *Goniaster Templetoni*, Thomp. Forbes, Wern. Mem. vol. viii. On examination of a species of *Goniaster* obtained by Mr. Ball from the Nymph Bank more than twenty years ago, it seemed to correspond with the description of what Mr. Templeton considered doubtfully as the *Ast. equestris* (Mag. Nat. Hist. vol. ix. p. 237.) and appearing at the same time to be undescribed I named it as above. Mr. Templeton's specimen is not now available for comparison, but the gentleman who found it, on being lately shown one from the south, stated that they were certainly of the same species. The *G. Templetoni* approaches the *Ast. pulvillus*, Mull. Z. D. vol. i. p. 19. tab. 19. more nearly than any other, and chiefly differs from it in the under surface being conspicuously tessellated.

in 1818 at the Nymph Bank, off the southern coast. One specimen, which is perfect, is 4 inches across ; the arms of the other, though much injured, are each 5 inches in length. The species is admirably represented in the *Zoologia Danica*.

Stellonia violacea, mihi.

Asterias violacea, Mull. Zool. Dan. vol. ii. p. 7. tab. 46. Northern, eastern, and southern (R. Ball) coasts. The typical forms of *S. violacea* and *S. rubens* are very distinct in appearance, yet, through their varieties, they sometimes approach so nearly as to render the propriety of their separation as species somewhat doubtful.

Stellonia glacialis, Forb. Wern. Mem. vol. viii.

Asterias glacialis, Linn.

—— *angulosa*, Mull. Z. D. vol. ii. p. 1. tab. 41. Youghal, Mr. R. Ball ; south-west coast of Cork, Mr. G. J. Allman. This species attains a very large size on the southern coast ; on the north-east I have obtained a few very small specimens only. *Ast. glacialis* is noticed in Templeton's catalogue as having been found by Mr. Grimshaw, from whom I learn that the *A. glacialis* of Flem. Brit. Anim. (*Stell. rubens*, Forbes) is the species alluded to, and not the present one.

{ *Stellonia hispida*, Forb. Wern. Mem.

{ *Asterias hispida*, Penn. Coast of Down, W. T.

{ *Luidia fragilissima*, Forbes.

{ *Asterias rubens*, Johnst. Mag. Nat. Hist. vol. ix. p. 144, f. 20.
Common about Youghal, Mr. R. Ball ; Glendore, county Cork, Mr. Allman.

Ophiura albida, Forbes. Common on the north-east coast. This species, lately described by Mr. Forbes (Wern. Mem. vol. viii.) as distinct from *O. texturata*, had been so distinguished by Mr. Hyndman and myself for some years.

Ophiocoma neglecta, Forb. Wern. Mem.

Ophiura neglecta, Johnst. Mag. Nat. Hist. vol. viii. p. 467. f. 42.
Common on the north-east coast. The first specimen obtained by Mr. Hyndman and myself, in Strangford lough in January 1834, was set apart as an undescribed *Ophiura*. Dr. Johnston, taking a similar view, described the species as new in the following year.

Ophiocoma bellis, Forb. Wern. Mem.

Ophiura bellis, Flem. Brit. Anim. Coast of Dublin, Mr. R. Ball, Mr. Hyndman ; Belfast and Strangford loughs, W. T.

Ophiocoma granulata, Forb. Wern. Mem.

Ophiura granulata, Flem. Brit. Anim. Coast of Dublin (R. Ball) and Down (W. T.). The species figured by Templeton (Mag. Nat. Hist. ix. 237.) with doubt as this species is the *O. rosula*.

Ophiocoma brachiata.

Asterias brachiata, Mont. Linn. Trans. vol. vii. p. 84. Of this species, apparently known only to Montagu, two specimens were obtained in August 1836, by Mr. Hyndman and myself, when dredging off Dundrum on the coast of Down: the body of the more perfect one is $\frac{1}{3}$ rd of an inch in diameter, the least injured arm $3\frac{1}{2}$ inches long, and where broken nearly as broad as at the base.

Ophiocoma minuta, Forbes. This *Ophiocoma* as distinguished by Mr. Forbes from *Op. rosula* (Wern. Mem. vol. viii.) has occurred to me in the north; and among marine productions from Courtmasherry harbour (county Cork) favoured me by Mr. Allman is a fine specimen. Templeton has noted the *O. minuta* of Pennant as Irish, but its identity with the present species is doubtful.

Holothuria pentactes, Mull. Z. D. vol. iii. p. 47. t. 108. f. 1—4? Among a quantity of marine productions dredged in Belfast bay in October last by my friend Edmund Getty, Esq., and kindly sent to me, was an injured specimen two inches in length, apparently of this *Holothuria*.

Mulleria papillosa*, Johnst. Mag. Nat. Hist. vol. vii. p. 584. f. 66. Dredged in Belfast and Strangford loughs in 1834, and subsequently by Mr. Hyndman and myself.

Cuvieria phantapus, Flem. Johnst. Mag. Nat. Hist. vol. ix. p. 472. f. 68.

Holothuria phantapus, Mull. Z. D. vol. iii. p. 54. pl. 112. In September 1835 I obtained by the dredge a single specimen at Bangor, county of Down.

VERMES.

Planaria tremellaris, Mull. Zool. Dan. t. 32. f. i, 2. At the end of April I have taken numbers of this species from the under sides of stones in pools among the rocks at Rockport, Belfast bay. The specimens were rather under the size—"long. 9 lin. lat. 4 lin."—attributed to the species by Muller, but were otherwise identical.

Planaria vittata, Mont. Linn. Trans. vol. xi. p. 25. tab. 5. f. 3. A

* See remarks on this generic name in Lamarck Anim. sans Vert. t. 3. p. 455. 2nd ed.

single individual of this extremely beautiful species (of which Montagu's two original specimens only have, I believe, hitherto been recorded) was taken by Mr. Hyndman and myself when dredging in Strangford lough on the 1st of October—in size it exceeded Montagu's, being 2 inches in length and one in breadth. It was of a whitish cream colour with black lines, occasionally broken or non-continuous, disposed longitudinally over the upper surface of the body, not unlike those which on a whiter ground render so attractive the plumage of the male silver pheasant (*Phasianus nycthemerus*): these lines are from the delicacy of the animal all visible when the under side—which in itself is plain white—is next the spectator; it was surrounded by a border of pure opake white, which from the transparency of the entire body within imparted a beautiful finish to its appearance: the two auricular appendages which emanate from the anterior margin exhibit a black line along their basal half posteriorly; eyes could not be distinguished.

This *Planaria* was in form quite a proteus, and gliding with an easy motion folded itself gracefully over every object that came in its way. Having placed it in a phial of sea water, one half of the body rested on the bottom and the other against the side, and being thus at the same time horizontal and perpendicular, and presenting throughout its entire length one mass of folds, of which no two were alike in size, it looked as singular as beautiful. Montagu's figure, though correct, gives no idea of the grace of the original; as usual, his description is admirable: he remarks, that a drawing was fortunately made from his specimens, two in number, upon the day on which they were procured, as next morning they had disappeared, having been dissolved in the sea-water.

ACALEPHA.

Medusa papillata, Abilg. in Zool. Dan. vol. iv. p. 24. t. cxl. Of this very minute species, $1\frac{1}{2}$ line in diameter, a specimen occurred to me in Strangford lough in October.

Medusa (Geryonia) hæmisphærica, Mull. Z. D. vol. i. p. 6. t. 7. On October 5, 1838, I obtained one of these *Medusæ* in Belfast bay, and a day or two afterwards many specimens were brought me by Mr. Hyndman from the same locality: in size they rather exceeded Muller's, measuring 5 lines in diameter in their most depressed state. This and the preceding species were determined from accurate drawings taken of the living animals. Mr.

R. Patterson informs me that he obtained the *G. hamispherica* at Larne in the summer of 1835.

Rhizostoma Cuvierii, Blainv. Actin. p. 297. t. 44. f. 1. Belfast, August 6, 1838. I received a fine specimen of this Medusa from Edmund Getty, Esq., whose attention was called to it yesterday by an old fisherman seventy years of age, who stated that "a large starfish, he had not seen the like of before," was lying on the beach near Holywood (Belfast bay). The specimen exactly accords with Blainville's figure of *R. Cuvierii* and with the *Med. undulata* of Borlase, as quoted by Pennant and Fleming. Its total length is 18 inches, the body $7\frac{1}{2}$, and thence to extremity of peduncles $10\frac{1}{2}$ inches: entire outer surface of the body, which is 12 inches in diameter, granulated over like the rind of an orange or lemon. The body is almost hyaline, with a very slight tinge of dusky yellow; peduncles and their appendages delicately tinged with lilac and roseate hues. Weight 6 lbs.

Oceania? tubulosa, Sars. Bekriv. ov Polyp. &c. p. 25. pl. 5. f. 11. April 18, 1840. I had the satisfaction today of identifying with this species, a *Medusa* of which several individuals were brought to me by Mr. Hyndman, just after their capture in Belfast bay. On calling the attention of Mr. R. Patterson to them, a reference to his notes on *Medusæ* showed that he had procured the same species at Larne (county Antrim), in May 1835, and June 1838; and again at Bangor (county Down), in July 1839. As my friend could not find the species described—Sars' work he had not for reference—he drew up a detailed and interesting account of the animal, accompanied by several characteristic sketches of it in various positions.

Having remarked that one of my specimens, which was in a phial containing $1\frac{1}{2}$ ounce of sea-water, appeared as lively after four days' captivity as at first, although the fluid had not been changed, nor any nutriment added, I, before leaving home for some days, handed it over to Mr. Patterson, that the period the animal would live under such circumstances might be noted. From him I learn that this individual lived thus for twelve days (from the 18th to the 30th of April), and that for the first ten it retained its ordinary vivacity.

ZOOPHYTA.

Hermia glandulosa, Johnst. Brit. Zoop. p. 111. vign. No. 12. and pl. 4. f. 1. 2.

Coryne glandulosa, Lam. Found attached to *Fucus nodosus*, growing at entrance to Strangford lough, W. T.

Tubularia indivisa, Linn. Johnst. B. Z. 113. pl. 3. f. 1. 2. Dublin bay, W. H. Harvey, Esq., 1834; Youghal, Miss Ball, 1836; Belfast and Strangford loughs, Mr. Hyndman and W. T.

——— *larynx*, Ellis and Solander. Johnst. B. Z. 115. pl. 3. f. 3. and pl. 4. f. 3—5. Belfast and Strangford loughs, Mr. Hyndman and W. T.; Dublin bay, Mr. R. Ball.

——— *muscoides*, Linn. A few specimens of a *Tubularia* which I obtained in Strangford lough in January 1835, parasitical on *Fucus nodosus*, and subsequently between tide marks at the island of Ireland's Eye, off the Dublin coast, were placed in my collection under this name. Having supplied a specimen to my friend Dr. G. Johnston, he remarked upon it—"This is what Agardh and Lamouroux say is the real *T. muscoides* of Linn., but not of any other author excepting Muller and Fabricius—you are the first to discover it on our shores." In so far as my limited observation extends, this would seem to be a littoral, *T. indivisa* and *T. larynx* to be deep water species*.

Thoa Beanii, Johnst. B. Z. 120. pl. 7. f. 1. and 2. Procured by dredging in Belfast bay, where it in some situations seems to take the place of *T. halecina*. Before it was described as a distinct species, its peculiarities, independently of the remarkable ovaries, were noticed by Mr. Hyndman and myself—its general aspect or habit first attracted our attention. Instead of the rigid "herring bone" appearance of *T. halecina*, it is somewhat flexible and graceful. Although not mentioned in the description, this difference is observable in the plates of the British Zoophytes.

Sertularia filicula, Ellis and Soland. Johnst. B. Z. 131. pl. 11. f. 1.

In Dr. J. L. Drummond's collection is a specimen of this coralline obtained many years ago near Ballycastle by that most distinguished botanist R. Brown. Bangor (Down), Sept. 1835, and subsequently, W. T†.

* *Tubularia ramosa*, Linn., noticed by Templeton as found in Dublin bay, occurs not uncommonly on shells dredged in deep water on the north-east coast.

† On reference to Mr. Templeton's specimens I find that the *Sertularia* named by him *S. pinnata* (Mag. Nat. Hist. ix. 468.), and subsequently *S. Hibernica* by Dr. Johnston, in consequence of the former appellation being preoccupied, is only a fine state of *S. polyzonias*. Since the publication of his work I submitted the original specimens to Dr. Johnston, who agrees with me in this opinion.

Plumularia pennatula, Ellis and Soland. Johnst. B. Z. 145. pl. 18. f. 1, 2. Specimens of this rare and beautiful species profusely invest about six inches of the stem of a *Laminaria digitata* obtained in a fresh state by Miss M. Ball at Youghal in 1837. It must rather I presume have been owing to the East Indies being the locality whence the specimens described by Ellis and Solander were brought, than to any fault in Fleming's description (which seems as good as one so brief could be) that led some authors on the continent to attribute it to other species. The Irish specimens correspond with the descriptions in the works of Ellis and Solander, Fleming and Johnston, and with the figures in the first and last—some of them are $4\frac{1}{2}$ inches in height.

Laomedea gelatinosa, Lamour. Johnst. B. Z. 152. pl. 21. f. 3, 4, and pl. 23. f. 1. Youghal, Miss Ball; Bangor, county Down, Oct. 1835. W. T. In the ordinary state parasitical on *Zostera marina* in both localities. Miss Ball has likewise obtained specimens presenting the finest state of the species, and 11 inches in height. See Brit. Zoop. pl. 23. f. 1.

Campanularia syringa, Lam. Johnst. B. Z. 155. f. 18. Of this species, which has not a place in Mr. Templeton's published catalogue, I find specimens labelled "Belfast Lough," in his collection—to myself it has occurred on the coasts of Down and Dublin.

Campanularia? dumosa, Flem. Johnst. B. Z. 157. pl. 23. f. 2—5. On *Tubularia indivisa* at Youghal 1836. Miss Ball.

On *Serialaria lendigera* and various corallines in Belfast Bay, W. T.

Caryophyllia Smithii, Stokes and Brod. Johnst. B. Z. 207. vign. p. 206. A few specimens were procured at Youghal, by Miss Ball, in April 1836, and subsequently—diameter of the largest $7\frac{1}{2}$ lines.

Actinia dianthus, Ellis, Johnst. B. Z. 216. pl. 28. Belfast bay, Dr. Drummond; Edm. Getty, Esq., Strangford lough, W. T. Amongst the various forms it assumes, I have seen this species present the exact appearance of the *Act. plumosa* of the Zoologia Danica. Mr. Templeton marks it with doubt as Irish.

Actinia maculata, Adams, Johnst. B. Z. 218. f. 32. This extremely beautiful species, taken by dredging in Strangford lough, in January 1835, by Mr. Hyndman and myself, has subsequently occurred to us commonly there and in Belfast bay—to *Bulla lignaria* as well as the larger *Trochi* it is occasionally found attached. Every shell that I have seen the *A. maculata* invest

was tenanted by the *Pagurus Prideauxii*, Leach, a species which, extensively as the native *Paguri* have been collected by me, never occurred under other circumstances.

Bowerbankia densa, Farre, Johnst. B. Z. 255. f. 41. p. 256. When shown this zoophyte by Dr. Farre in the spring of 1837, I recognised it as a species which had not uncommonly occurred to me in the north-east coast, attached in the form of minute tufts to the stems of *Desmarestia aculeata*, *Furcellaria fastigiata*, &c. I once procured it from the under side of a stone in Belfast bay.

Lagenella repens, Farre. *Bowerbankia repens*, Johnst. B. Z. 256. vign. p. 235. In January 1835, this occurred to me in Strangford lough, but I was unable to identify it with any described species. Dr. Farre's excellent memoir, which appeared in the Philosophical Transactions for 1837, supplied this want; and since that time I have by the examination of the living polype obtained in the locality just named (and on the same species of algæ as the *B. densa*,) ascertained to a certainty its identity with *B. repens*.

Crisia luxata, Flem. Johnst. B. Z. 262. pl. 30. f. 5. 6. Attached to the base of various algæ collected near Glenarm by Miss Davison in 1833. Youghal, Miss Ball; Waterford coast Miss A. Taylor.

**Anguinaria spatulata*, Lam. Johnst. B. Z. 266. pl. 30. f. 7, 8. This is stated in Mr. Templeton's catalogue to have been "found on the shore at Carrickfergus, on the sand, Aug. 1811."—Mag. Nat. Hist. ix. p. 466. The specimen labelled under this name in Mr. Templeton's collection is *Campanularia syringa*, but having "Belfast Lough" simply written on it may not be the one published. Of the *A. spatulata* I possess specimens which invest the stem of *Dasya coccinea*, collected at Youghal by Miss Ball.

†*Tubulipora patina*, Lam. Johnst. B. Z. 267. pl. 31. f. 1—3. On

* *Hippothoa lanceolata*, Gray. Johnst. B. Z. 265. As only one habitat, Kinsale, county Cork, is known for this very minute, but well-marked species, it may be stated that it once occurred to me on a stone dredged in deep water at the entrance of Strangford lough.

† *Tubulipora obelia*, Johnst. B. Z. 269. pl. 31. f. 7, 8. Obtained with the last. Specimens from Kinsale have been noticed by Mr. J. E. Gray, but the species being considered rare, a second and northern habitat is given. By reference to Mr. Templeton's specimens, I find that his *Pherusa tubulosa* (Mag. Nat. Hist. ix. p. 469,) is the *Tubulipora serpens*, Flem. (*T. transversa*, Lam.)—This species it will be recollected was the *Millepora tubulosa* of Ellis and Solander.

- Cellepora cervicornis*, &c. from the southern coast, in Mr. R. Ball's collection. North-east coast, W. T.
- Discopora hispida*, Flem. Johnst. B. Z. 270. pl. 31. f. 9—11*. Not uncommon on marine plants and shells in the north and south.
- Cellepora cervicornis*, Flem. Johnst. B. Z. 276. pl. 33. Obtained many years ago in abundance from the Nymph Bank by R. Ball, Esq.
- Lepralia hyalina*, Johnst. B. Z. 277.
- Cellepora hyalina*, Linn. Common on marine plants, &c. on the shores of Ireland from north to south.
- Lepralia nitida*, Johnst. B. Z. 277. pl. 34. f. 7.
- Cellepora nitida*, Fabr. On stones, &c. dredged in deep water at entrance of Strangford lough.
- Lepralia coccinea*, Johnst. B. Z. 278. pl. 34. f. 1—3.
- Cellepora coccinea*, Lamour. This species first occurred to me of a snow white colour, on the bark of a tree washed ashore at Bangor (Down) in January 1834:—on stones and shells dredged in deep water on the north-east coast, it was of the ordinary pale reddish purple hue.
- Lepralia variolosa*, Johnst. B. Z. 278. pl. 34. f. 4. On *Pinnæ* dredged at Cork, and favoured me by Mr. R. Ball, rare. I have obtained this species on the shell of the common edible crab (*Cancer Pagurus*, Leach) taken near the entrance of Belfast bay.
- Lepralia ciliata*, Johnst. B. Z. 279. pl. 34. f. 6.
- Eschara ciliata*, Pall. Common on marine plants, shells, &c. around the Irish coast.
- Lepralia immersa*, Johnst. B. Z. 280. pl. 34. f. 8.
- Berenicea immersa*, Flem. On *Pinnæ* from Cork. North-east and Dublin coast, Mr. Hyndman and W. T.
- Flustra lineata*, Linn. Johnst. B. Z. 288. pl. 37. f. 4. On *Laminaria digitata* and on stones dredged in Strangford lough. W. T.
- † *Flustra tuberculata*, Johnst. B. Z. 289. pl. 34. f. 9. On shells and stones from Belfast and Strangford loughs. W. T.
- Alcyonidium gelatinosum*, Lamour. Johnst. 300. pl. 41. f. 1—3.
- Ulva diaphana*, Eng. Bot. t. 263. Of occasional occurrence on the north-east coast. W. T.

* Dr. Johnston's figures represent a singular state of the species; the ordinary one is very different.

† *Flustra spongiosa*, Templeton, Mag. Nat. Hist. ix. 469. *Membranipora spongiosa*, Brit. Zoop. p. 252, is identical with *Flustra? carnosa* of the latter work. Dr. Johnston agrees that the specific name *spongiosa* should, in right of priority, be retained for the species.

Alcyonidium hirsutum, Johnst. B. Z. 303. pl. 42. f. 1, 2.

Alcyonium hirsutum, Flem. Not uncommon on the northern shores. W. T.

Alcyonidium echinatum, Johnst. B. Z. 304. pl. 42. f. 3, 4.

Alcyonium echinatum, Flem. Commonly encrusting univalve shells around the coast.

Alcyonidium? *parasiticum*, Johnst. B. Z. 304. pl. 41. f. 4, 5. Attached to *Sertulariæ*, &c. on the northern and eastern shores. W. T.

Plumatella repens, Lam. Johnst. B. Z. 322. f. 51. In rejectamenta on the shores of Lough Earn, I obtained this species in Sept. 1837.

Spongia mammillaris, Zool. Dan. vol. iv. p. 44. tab. 158. f. 3, 4. A specimen of this sponge, which I have not seen referred to as identical with any British species, was dredged in Strangford lough in 1835, by Mr. Hyndman and myself.

Halichondria parasitica, Flem.

Spongia parasitica, Mont. Wern. Mem. vol. ii. p. 114. Not uncommon on marine plants and the larger corallines on the north-east coast. W. T.

Halichondria suberica, Flem. Coldstream, Edin. New Phil. Jour. 1830. vol. ii. p. 235. pl. 4.

Spongia suberica, Mont. This species, as represented by Dr. Coldstream, has occurred to me investing univalve shells dredged in the loughs of Strangford and Belfast. In the former locality I in 1835 obtained the *Spongia?* *suberica*, which in the Magazine of Natural History, vol. vii. p. 491, is described and figured by Dr. Johnston, who considered it the "perfect state of the *H. suberica*."

Halichondria ventilabra, Flem. Sea-fan sponge, Ellis, Phil. Trans. 1765, p. 289. tab. 11. f. H.

Spongia ventilabra, Linn. Specimens of this sponge (with one of which I have been favoured,) were obtained by Mr. R. Ball from the Nymph Bank in 1818.

Grantia ciliata, Flem.

Spongia ciliata, Fabr. *Sp. coronata*, Ellis and Soland. Zoop. p. 190. tab. 58. f. 8 and 9. This very beautiful species I have commonly found on marine plants on the north-east coast, and occasionally of large size*.

* *Flabellaria opuntia*, Blain. Actin. p. 551. tab. 96. f. 4. *Halimeda opuntia*, Flem. Brit. Anim. p. 515. A specimen of this *Flabellaria* in

CRUSTACEA.

Pirimela denticulata, Leach. Mal. pl. 3. Edw. Crust. t. 1. 424.

Amongst a number of invertebrata collected some years ago on the coasts of Down and Antrim by Dr. J. L. Drummond, and which I owe to his kindness, was an individual of this species.

Portunus pusillus, Leach, Mal. pl. 9. f. 5—8. Edw. Crust. t. 1. 444.

In course of dredging in the loughs of Strangford and Belfast a few specimens of this crab have generally occurred to me. Some in Mr. R. Ball's collection were similarly obtained by him in Dublin bay.

Ebalia Bryerii, Leach, Mal. pl. 25. f. 12. Edw. Crust. t. 2. 129.

A single individual of this rare species, with which I have been favoured by Mr. Hyndman, was procured by him from deep water in Belfast bay*.

Pagurus Prideauxii, Leach, Mal. pl. 26. f. 5. 6. Edw. Crust. tab. 2. 216. See *Actinia maculata*, p. 251.

Galathea nexa, Embleton, Proceedings Berwickshire Club. p. 71. pl. 1.

I have found in the stomachs of cod-fish brought from the coasts of Down and Antrim to Belfast market; and in Dr. Drummond's collection are specimens which were similarly procured. A comparison of one of these with an original specimen in Dr. Johnston's possession, proved, what from its agreement with the description and figure I had previously little doubt of, the identity of the species.

Mr. R. Ball's collection was found some years ago by Mr. Wm. Todhunter, among the refuse of a Torbay (Devonshire) fishing-boat, in Dublin bay;—it was brought up in the trawl-net somewhere between these two ports. This species has hitherto, I believe, been noticed but in one locality in the British seas. Vide Flem. l. c.

* The following Brachyurous Crustacea having in Ireland been hitherto noticed only as occurring on the coast of Cork, may be worth mentioning here.

Hyas coarctatus, Leach. Frequent in deep water on the north-east coast, W. T. Dublin bay, Mr. R. Ball.

Eurynome aspera, Leach. In Oct. 1834 and subsequently, a few specimens have been procured by Mr. Hyndman and myself when dredging in Strangford lough.

Portunus arcuatus, Leach. *P. Rondeletii*, Edw. In January 1835, and since obtained by dredging in Strangford lough. W. T. When at Killinchy, on the shore of this lough, on the 1st Oct. last, and looking to the refuse in a number of small boats which had been employed the previous night in herring fishing, I found in every one of them several of these crabs, and none of any other species.

Ebalia Pennantii, Leach. In Sept. 1836, a specimen was taken in Belfast bay by Mr. Hyndman, and subsequently another was procured here by Dr. Drummond. For one obtained in Dublin bay I am indebted to Mr. G. J. Allman.

Callianassa subterranea, Leach, Mal. pl. 32. Edw. Crust. t. 2. p. 309.

Cancer Astacus subterraneus, Mont. Linn. Trans. vol. ix. p. 88. t. 3. f. 1, 2. March 25, 1839. On examining the contents of the stomach of several individuals of the *Platessa Pola*, which were taken early this morning off Newcastle (county Down), two of the larger arms of this species, so peculiar in form and still retaining their beautiful pink colour, were detected.

Pasiphaea Sivado, Risso, Hist. Nat. l'Eur. Merid. t. 5. p. 81. ed. 1826. Edw. Crust. t. 2. p. 426. In the British Museum there is a specimen so named, and labelled "Ireland." From the donor, the Rev. James Bulwer, I learned that it was taken by him in the vicinity of Dublin.

Dexamine spinosa, Leach. Desm. Gen. Cons. Crust. p. 263. pl. 45. f. 6.

Cancer gammarus spinosus, Mont. Has occurred to me not uncommonly on the north-east coast.

Dynamena rubra, Leach, Desm. p. 298. As last. This species was determined from comparison with Dr. Leach's specimens in the British Museum.

Æga bicarinata, Leach, Desm. p. 305. March 30, 1839. I procured an individual of this species alive in Belfast market, whither it was brought with oysters from Carrickfergus. It was not known to Dr. Leach whence the specimen was brought that served for his description, and the works accessible to me in which the species is introduced do not contain any information as to its habitat.

Caprella linearis, Latr. Johnst. Mag. Nat. Hist. vol. viii. p. 672. f. 71. Found among marine plants collected near Glenarm by Dr. Drummond, in May 1836, and subsequently obtained in abundance by Mr. Hyndman and myself upon *Plumularia*, &c. dredged in Strangford lough.

Bopyrus squillarum, Latr. Desm. p. 325. t. 49. f. 8--10. A *Palemon serratus*, taken by Mr. R. Ball at the South Islands of Arran, off the coast of Clare in June 1835, contained within the plates of the head a fine specimen of this *Bopyrus* $6\frac{1}{2}$ lines in length, and agreeing with the female as represented by Desmarest and other authors.

Argulus foliaceus, Jurine. See a separate communication at p. 221.

Lernæa uncinata, Mull. Z. D. vol. i. p. 38. t. 33. Johnst. Mag. Nat. Hist. vol. viii. p. 565. f. 53. I obtained on the gills of a *Gadus callarias*, taken at Larne (county Antrim) in the summer of

1834. By Dr. Bellingham of Dublin I have been favoured with specimens, which he found attached to the gills of whiting (*Merlangus vulgaris*) brought to the market of the metropolis.

**Lernæa cornuta*, Mull. Z. D. vol. i. p. 40. tab. 33. f. 6.

Entomoda cornuta, Lam. t. 3. p. 686, 2nd ed. To Dr. Bellingham I am indebted for specimens of this *Entomoda*, which were found by him attached to the gills of sole, purchased in Dublin market in May 1837.

Chondracanthus Lophii, Johnst. Mag. Nat. Hist. vol. ix. p. 81. f. 16. The first specimens which I have seen were procured by Dr. Scouler on a *Lophius piscatorius* in Dublin—more recently they occurred to myself, in the pouches of a fish of the same species brought to that city.

In concluding the present "Additions," it may be mentioned, that as a further step towards a Fauna of Ireland, I intend publishing catalogues of the species contained in all the departments which have occupied my attention, whenever they may have been satisfactorily investigated, giving at the same time such details as may seem desirable.

XXIX.—On the "Freshwater Carriers," or *Thelidomus* of Mr. Swainson.

MR. SWAINSON in his *Malacology*, a recent volume on "Shells and Shell-fish," has established a genus, under the name *Thelidomus*, upon two bodies which he received with some *Planorbis*† from Brazil. These "two *Helix*-looking shells," as he calls them, he considers as "absolute counterparts of" the carrier *Trochi*, and states that they "fill the same situation among the *Rotellinæ* which *Onustus* (the carrier *Trochus*) does among *Trochinæ*." He also represents them as forming a passage from these animals to the *Helices*, and observes that the "discovery of this extraordinary shell will probably induce naturalists to a more accurate examination of the fossil turbinated univalves than they have received;

* *Lernæa branchialis*, Linn. Guérin Icon. Règne. An. Zoop. pl. 9. f. 1.

—— *gadinae*, Mull. Z. D. vol. iii. p. 65. tab. 118.

This species is published as Irish by Mr. J. V. Thompson. By Mr. Glennon, of Suffolk Street, Dublin, I have been presented with specimens, of which he procured several from the gills of a cod brought to the market of that city.

† Mr. Swainson's plural is *Planorbi*.—Ed.

for it is clear, that, although *Thelidomus* opens the path to the *Helicidæ*, there must be several other forms between the two, either extinct or undiscovered," p. 228.—The bodies which he here describes, and the "singular discovery" which he represents as throwing an "entirely *new light* on this interesting question", are "actually composed of little stones and grains of sand only, agglutinated together," p. 227 and 353, and are the cases of a caddis worm which is very common in Brazil and the United States. It differs from the cases of the European kinds in being spiral; but it agrees with them in being pervious at each end, though the hole at the smaller end appears to have escaped Mr. Swainson's observation. The North American cases have been described by Mr. Lea, under the name of *Valvata arenifera*. It might have been supposed that the ridicule which Mr. Lea has incurred for this error, would have prevented any other naturalist from falling into the same mistake. Indeed it is difficult to understand how any one who considers the formation and structure of shells, should not have reflected on the peculiarity of the formation of these bodies before he described them, and proceeded to build up such important reasonings upon their supposed place in his system.—JOHN EDW. GRAY.

XXX.—*Monograph of the Dorylidæ, a Family of the Hymenoptera Heterogyna.* By W. E. SHUCKARD, Esq.

[Continued from p. 201.]

Sp. 6. *Labidus Hopei.* Shuck.

Length 6 lines.

Expansion of the wings 12 lines.

Rufo-testaceus, pubescens: capite (mandibulis antennisque exceptis) atro; thorace fusco, scutello in medio sulcato, et pedunculo abdominis transverso quadrato, supra subconvexo.

Reddish testaceous, pubescent, the hair longest upon the legs, and beneath the first ventral and the whole of the terminal segments of the abdomen. The head having the vertex and face deep black and shining, the remainder castaneous, the carinæ of the face terminating gradually in front of the anterior ocellus; ocelli placed in a curve on the vertex; antennæ slender, the scape about one-fifth the length of the organ; mandibles moderately long and very slender, having but a small open space between them and the clypeus.

Thorax subfuscous, very gibbous both in front and at the scutellum, the latter longitudinally sulcated in the centre; superior wings with their nervures pale testaceous; marginal cell regularly lanceolate, considerably larger than either of the two first submarginals, and rounded within the first submarginal, which is rather smaller than the second, from which it is separated by an inwardly curved transverso-cubital nervure; the recurrent nervure inserted at less than one half the length of the second submarginal cell, and beyond which, and as far as the second transverso-cubital, the cubital nervure is considerably thickened: legs short and slender.

Abdomen shining, the base of all the segments constricted, the peduncle as wide as the following segment, transverse quadrate, the posterior angles truncated, plane above with a transverse convex ridge at its apex, and its ventral portion viewed laterally produced in the middle into an acute tubercle. The terminal segment vertically much compressed at its extreme apex, where it has a deep fissure, and the sexual organ protruding in the form of a deeply emarginate plate, terminating on each side in a compressed acuminate spine.

In the collection of the Rev. F. W. Hope.

This species, which was also captured by Mr. Swainson in the Brazils, is distinguished from all the rest I know by its longitudinally sulcated scutellum: other prominent differences are supplied by the relative proportions and form of the marginal and cubital cells and the insertion of the recurrent nervure.

Sp. 7. Lab. D'Orbignii, *Shuck.*

Length $6\frac{1}{2}$ lines.

Expansion of the wings 12 lines.

Niger, brunneo-holosericeus, pedunculo abdominis semicirculato supra subconvexo, nervis alarum brunneo-testaceis.

Black, covered with a close brownish silky down. Head having the ocelli small and placed in a very open curve at the vertex, and with an elevated carina connecting the posterior pair, the carinæ of the face curving off and terminating in front of the anterior one; antennæ fulvous beneath, moderately long, and thickest at the base, the scape rather less than one-fifth the length of the organ: mandibles moderate, very slender, and leaving a nearly semicircular space between them and the clypeus.

Thorax very gibbous in front and at the scutellum: superior wings with the nervures brownish testaceous; the marginal cell short and broad, extending but a little way beyond the apex of the second submarginal cell, where it is angulated; the first submarginal larger than the second, from which it is separated by a slightly inwardly curved nervure; the second submarginal rather narrow, and having the recurrent nervure inserted at about half its length, where immediately at the junction the cubital nervure is slightly thickened: legs short and slender, loosely covered with long hair.

Abdomen with the base of the segments slightly constricted, its sides, at the junction of the dorsal and ventral plates, inclining to a bright testaceous; the peduncle nearly semicircular; the posterior angles straight, plane above, with a transverse convex ridge at its apex; the ventral portion viewed laterally produced acutely in the middle; the extreme apex of the terminal segment vertically compressed, and the sexual organ protruding in the form of an emarginate plate, the lateral portions of which form two acute and compressed spines.

In Mr. Westwood's collection.

This species is from South America, where it was captured by Mons. D'Orbigny, whose name Mr. Westwood suggested should be applied to it, which I accordingly adopt. It is the only black species I know, and the peculiarities of its small ocelli and broad marginal cell also conspicuously distinguish it.

Sp. 8. Lab. Klugii, *Shuck.*

Length $4\frac{1}{2}$ lines.

Expansion of the wings $8\frac{1}{2}$ lines.

Rufo-castaneus, pubescens; vertice, thoracis dorso et stigmatibus alarum badiis: clypeo tuberculis binis acutis instructis et pedunculo transverso quadrato subconvexo.

Reddish castaneous with the vertex, dorsal portion of the thorax and scutellum, as also the stigma of the wing and the extreme base of the intermediate segments of the abdomen, dark castaneous. Head having the antennæ very long and slender, the scape scarcely one-seventh the length of the organ; the ocelli placed in a curve upon the vertex, the posterior pair situated close to the margin of the eyes: the facial carinæ less prominent than usual, and terminating by the side of the anterior ocellus; the clypeus armed with two acute and prominent tubercles, the space between which and the mandibles narrow; the latter moderate and very slender.

Thorax very gibbous in front, and at the scutellum, the latter fringed laterally: metathorax slightly convex: superior wings with their marginal cell regularly lanceolate and rather larger than either of the two first submarginals; the radial nervure rounded and not angulated; the first submarginal rather larger than the second, the transverso-cubital nervure that separates them being straight; the recurrent nervure received at about one half the length of the second submarginal cell, and the cubital nervure beyond its insertion not thickened: legs very short and slender.

Abdomen with the base of the intermediate segments slightly constricted: the peduncle rather narrower than the following segment, transverse quadrate, the posterior angles slightly rounded, plane above, with a slight convexity in the centre of its apex; the apex of the terminal segment less vertical than usual, but much compressed and fissile; the sexual organ protruding in the form of a deeply emarginate plate,

the sides of which are acuminate in two prominent teeth, and beneath from the emargination it is canaliculated. In my own collection.

This species is from St. Vincent's in the West Indies, where it was collected by the late Rev. Lansdown Guilding, from whose collection I purchased it. It is remarkably distinguished from all the others by the two teeth of the clypeus and the length and slenderness of its antennæ, besides other differences.

Sp. 9. Lab. Romandii, Shuck.

Length $4\frac{1}{2}$ lines.

Expansion of the wings $7\frac{1}{2}$ lines.

Rufo-testaceus, subpubescens: vertice badio, stigmatibus alarum brunneo-fusco et pedunculo abdominis quadrato convexo.

Reddish testaceous, subpubescent. Head having the vertex dark castaneous, on which the ocelli are in a curve and very large, the posterior pair placed rather laterally and near the margin of the eyes; the facial carinæ small and rounding off to the sides of the anterior ocellus: antennæ moderately long, the scape very short, the flagellum not thickest at the base: mandibles short and slender, leaving but a small narrow space between them and the clypeus.

Thorax slightly gibbous in front; the scutellum not gibbous, rather flattened above: metathorax rounded: superior wings with their nervures very slender and brown, the stigma dark brown: the marginal cell lanceolate, larger than either of the two first submarginals, and slightly acuminate beyond the apex of the second, which is less than the first, from which it is separated by a nearly straight transverso-cubital nervure; the recurrent nervure inserted in the centre of the second submarginal cell, and the cubital nervure thickened merely at the junction: legs short and slender.

Abdomen with the base of the intermediate segments constricted, the terminal ones slightly compressed; the peduncle quadrate, slightly convex, narrower than the second segment, which is also a little narrower than the third; the two last segments slightly laterally compressed, and the apex of the terminal one very much compressed and fissile: the sexual organ protruding as usual. In my own collection.

This species was also captured by Mr. Swainson in the Brazils. I have dedicated it, as a small tribute of respect, to Mons. de Romand, an ardent lover of the Hymenoptera, whose rich collection would, I expect, yield other species had I the opportunity of examining it. The present is singularly distinguished by the form of the peduncle, the compression of the segments, and the proportionate differences between the second and third: its small mandibles are also of a very peculiar character.

? Sp. 10. Lab. mediatius, Fab.

Niger thorace arcu antico cinereo, abdomine rufo: petiolo anoque nigris.

Dorylus mediatius, Fab. Sys. Piez. 428. 3.

Habitat in America meridionali, Dom. Smidt. Mus. Dom. de Sehestedt.

Media. Antennæ nigræ: articulo secundo basi ferrugineo. Caput nigrum, labio cinereo villosa. Thorax niger, arcu antico cinereo. Abdomen rufum, petiolo anoque nigris. Alæ obscuræ.

Latreille and St. Fargeau have surmised, from the country of this insect, and from Fabricius having associated it with his *Doryli*, that it must be a *Labidus*. I think, however, both from the distribution of colour and his description of the labium (labrum), that it cannot belong to either of these genera; but what it may possibly be I cannot at all surmise.

N.B. Dr. Maximilian Perty, in the 'Delectus Animalium Articulatorum' of the Brazilian Travels of Spix and Martius, has figured in plate 27, fig. 11, a *Labidus* which he calls *Lab. Latreillii*, and at p. 138 he thus describes it:—

Totus badio-testaceus, albido-pubescent; ocellis magnis, hyalinis; alis albis, nervis flavicantibus.

Length 7 lines, width of prothor. $1\frac{1}{2}$ line.

Expansion of the wings 16 lines.

He says it occurs in the province of Piahiensi and in Southern Brazil.

It is very probable that this is a distinct species, or that the species from each of these localities are different, but without a careful examination it is impossible to say. If however they are both of the same size, and the expansion of the wings is the same, they are doubtlessly identical; the proportions between the expansion and the length differ so considerably from any that I have described, and as by a comparison with the description of the genuine *Lab. Latreillii* above it appears evidently different from that, I therefore propose to call it

? Sp. 11. *Lab. Pertii*, *Shuck.*

Lab. Latreillii. Perty, Del. An. Art. Tab. 27. fig. 11. p. 138.

GENUS *TYPHLOPONE*, *Westw.**

Head oblong, convex, emarginate behind, occasionally longitudinally sulcated, and nearly as long as the thorax, not exhibiting either eyes or ocelli.

Antennæ about as long as the head, inserted within two short parallel facial carinæ, and close to the anterior margin of the clypeus, geniculated and subclavate, consisting apparently of only ten joints; the

* Mr. Westwood has neither given a generic nor specific description of what he calls *Typhlopone fulva*; he has only given an outline of the insect, and of its maxilla and labium and their palpi, and described the mandibles. See *Intro. to Mod. Class. of Ins.* vol. ii. p. 226. fig. 86, and the descriptions at p. 219. And he has not noticed the remarkable structure of the antennæ, apparently wanting two joints.

scape clavate, nearly as long as the flagellum, which is also clavate; the terminal joint half as long as the scape, the intervening ones short and subequal.

Mandibles sickle-shaped, serrated ? along their inner edge. *Westw.*

Maxillary palpi short and two-jointed, the joints subglobose. *Westw.*

Labial palpi longer, also two-jointed, the joints subclavate. *Westw.*

Mentum subtrilobate in front. *Westw.*

Thorax oblong, much narrower than the head, with a deep transverse suture separating the meso- and metathorax, the latter with a large circular spiracle at its base above. *Legs* simple, thighs subclavate; *tibiæ* slender at the base, increasing slightly towards the apex, where they are all furnished with a simple calcar, which is somewhat dilated at the base; *tarsi* slender, longer than the *tibiæ*, the terminal joints of the anterior slightly dilated, all the terminal claws simple.

Abdomen elliptical; the basal segment quadrate convex, forming a peduncle, and separated from the next by a deep incision; the ventral portion acutely produced, the following slightly constricted at their base, and all exhibiting laterally a conspicuous spiracle; the terminal segment abruptly truncated or subretuse at its apex, the dorsal portion armed laterally with two minute spines, and the ventral with a single one.

It is here requisite that I should state my reasons for considering the three following insects as probably the females of the genus *Labidus*. In the absence of any observation relative to their habits, my arguments must necessarily all be derived from structure; and deduced from this I still admit that there is one, and only one, point that makes me waver in my supposition. Sexual discrepancies are universal throughout the Heterogyna, for it is rarely the case that the partners resemble each other, therefore those differences here must not startle us. In the preliminary observations I have already shown that the males, the only sex accurately known of the genera of this family, possess characters found partially in the *Solitary* and *Social Heterogyna*, but conjunctively nowhere excepting in themselves, and upon this I establish a claim for their constituting a family intervening between both. In these apterous insects (*Typhlopone*) I can exhibit a similar combination, which consequently proves that they necessarily belong also to this family. In the form of the head they are most closely like the female *Scleroderma**,

* I am prepared to show from the analogy of one of the *Thynnidae*, of which I have both sexes taken *in copulâ*, (the female of which is the *Diamma ephippiger* of Guérin, and the male a *Rhagigaster* of the same author,) that *Scleroderma* belongs to the Solitary Heterogyna, and not to the *Bethylidae* as supposed by Mr. Westwood in his Monograph, and that the males he has described as belonging to them are certainly misplaced. There is every probability that what is usually considered as the *Myzine* of Latreille, but which is the *Elis* of Fabricius, are the true males of *Scleroderma*, there being no European species of the genuine *Myzine*, which is the

and in the anomalous limitation of the number of joints of the antennæ, they resemble *Myrmecodes* and the rest of the apterous *Thynnidæ*, although in the latter there is one joint more to be seen than in these, viz. eleven. This curtailment is never found in the apterous Social Heterogyna, to which however the single calcar to all the tibiæ, and their wanting eyes, approximates them, and I have before stated that in the armature of the apex of the abdomen they much resemble *Ponera*. They thus partake of both groups, but they have this peculiar to themselves amongst the apterous Heterogyna, viz. the small development of the prothorax, which cannot be seen from above, and the large development of the mesothorax at the expense of it; now in the apterous individuals of both the adjacent groups, the Social and Solitary Heterogyna, we find either a very large development of the prothorax or an equal one of both pro- and mesothorax; and in their males either the three divisions are equal, or the meta- and meso- are equal and more fully developed than the prothorax; but where the meso- and metathorax are unequal, it is the latter which is most developed. In the male *Dorylidæ* we also find an enormously developed mesothorax, and the prothorax rarely observable from above; to these they are likewise closely linked by the two-jointed palpi, the size and conspicuousness of the lateral spiracles of the thorax and abdomen, as also by the insertion of the antennæ near the edge of the clypeus. To *Labidus* especially do they appear connected, by the carinæ of the face, the dilatation of the base of the calcaria, the proportions of the labial and maxillary palpi, and the form of the mandibles, the latter differing no more than might be expected in the opposite sex. The slight constriction of the segments of the abdomen appears also a connecting resemblance. If from the preceding argument it is admitted that these apterous insects must belong to the *Dorylidæ*, and from analogy we may infer that they are females, and when we know that their country is America and the West Indies, and that none but females have yet occurred, and when it is further considered that there is a genus of the same family from the same country of

Plesia of Jurine, the type of it being the *Tiphia maculata*, Fab. Besides this I am acquainted with genuine males of these *Plesiæ* which closely resemble their females, and are totally different in structure from the *Elis sercincta*, Fab., the type of his genus *Elis*, and which has been latterly usually considered as the *Myzine* of Latreille. Were the females of this genus *Elis* winged, as several species of the male occur in the South of Europe, it would be strange that the female should not have been captured ere this. Sidney Smith Sanders, Esq. has informed me that he finds several species of *Scleroderma* not uncommon in Greece, where also he has found more than one species of the male *Elis*, and for one species of each of which I am indebted to him.

which we only know the males, and when I have also shown that there are as many structural resemblances as might be expected, or is usual between the opposite sexes of these anomalous groups, surely it is not presumptuous to suppose, in the absence of positive testimony, that these may be the sexes of the same genus. The solitary point which still causes me at all to doubt it, is the minute tooth beneath and within the apex of the claws of the males of the genus *Labidus*, although it is scarcely obvious in the smaller species of that genus; therefore in these small females, which are much smaller than the smallest males, this tooth may become obsolete. The disparity of size in the sexes, I have before stated in the preliminary observations, is no objection to the hypothesis. I proceed accordingly to describe them as *Labidi*.

Sp. 12. Lab. (1 Typhlopone) *Kirbii*, *Shuck*. Length of the head 1 line.
Probable length $4\frac{1}{2}$ lines.

Capite castaneo nitido punctulato, antice subsulcato, mandibulis badiis.

Head bright chestnut, shining, very slightly and loosely punctured; slightly longitudinally channeled in front, but which terminates abruptly in a small fossulet at about one-third the length of the head: without eyes or ocelli. Mandibles dark pitchy chestnut, flagellum of the antennæ also obscure.

In my own collection.

Of this insect I have only the head, which is attached to the thigh of a *Formica*; to judge from the size of this head and the comparative proportion to the whole insect in other species, this would be the largest. I dedicate it with much respect to the venerable promoter of the science of Entomology in this country, whose *Monographia Apum Angliæ* will ever remain a standard of high perfection.

Sp. 13. Lab. (2 Typhlopone) *Curtisii*, *Shuck*.

Length about four lines.

Rufo-testaceus, glabratus; capite punctulato, postice profunde sulcato; mandibulis badiis.

Reddish testaceous. Head brightly shining, punctulate, deeply sulcated longitudinally in the centre behind, the channel terminating near the centre of the head in a moderately large fossulet: without eyes or ocelli; mandibles pitchy-brown.

Thorax opake, more closely and deeply punctured than the head.

Abdomen brightly shining, very slightly punctured, the peduncle quadrate, opake and convex, the third and fourth segments slightly constricted at their base, the apex of the terminal segment abruptly truncated and armed on each side with a minute spine.

In the collection of the British Museum.

This insect is distinguished from the preceding by its smaller size and by the deeper sulcation appearing only on the vertex. It

is dedicated to John Curtis, Esq., the author of the British Entomology, in which work the portions devoted to the Hymenoptera were evidently a labour of love.

Sp. 14. Lab. (3. Typhlopone) *Westwoodii*, Shuck. Length 3 lines.
Testaceus ; capite (mandibulis piceis exceptis) castaneo nitido, valde punctato et in medio sulcato.

Pale reddish testaceous. Head bright chestnut, shining, rather closely and deeply punctured, deeply sulcated longitudinally above in the centre, the channel dividing the head into two halves ; mandibles pitchy red. Thorax more closely and deeply punctured than the head, and about its length.

Abdomen brightly shining, scarcely punctured, the peduncle quadrate, opaque, convex, the ventral portion produced into an acute tubercle, the following segments slightly constricted at their base, the apex of the terminal one subretuse, armed on each side with a minute spine, and its ventral portion also furnished with a minute central spine.

In my own collection.

From South America. Its distinction from the two preceding consists, exclusive of size, in the entire longitudinal sulcation of the head.

Genus *ÆNICTUS*, Shuck.

Body elongate cylindrical.

Head small, transverse, flat.

Antennæ short, setaceous, curved, inserted upon the anterior margin of the clypeus, and not quite so long as the insertion of the superior wings, the scape about one-third the length of the flagellum, the joints of the latter equal.

Eyes globose, lateral, and very prominent.

Ocelli placed in a slight curve upon the vertex, large and very prominent.

Mandibles edentate, elongate, slender, compressed, very much curved, slightly broader at the base, and forcipate.

Labrum truncated at the apex, where it is emarginate in the centre.

Maxillæ

Maxillary palpi } ? *

Labial palpi

Thorax short, oval : *collar* or *prothorax* more developed than in *Dorylus*, and not concealed in front by the gibbosity of the mesothorax : *scutellum* quadrate, very gibbous, slightly projecting over the metathorax, which is perpendicular.

Tegulæ small but distinct.

Superior wings with a large stigma, one acuminate, marginal cell angu-

* The internal trophi I am obliged to pass over, but as they are scarcely distinguishable in the large species of *Dorylus*, in a small insect like the present, which is at least fifty times less, the investigation would incur a certainty of destruction without possibly effecting the object ; but it is quite sufficiently distinguished by its more obvious characters.

lated within, and two submarginal cells, the first of which is smaller than the second, and receives the recurrent nervure at nearly three-fourths of its length.

Legs short and slender: *coxae* robust, canaliculated above for the articulation of the femur: *trochanter* not distinct: *femora* and *tibiæ* slender and subcylindrical, the latter furnished at their apex with a single calcar: *tarsi* slender, longer than the *tibiæ*, the basal joint as long as the three following, the fourth joint the shortest: the *claws* simple.

Abdomen elongate, curved downwards, cylindrical and slightly clavate; the dorsal segments, but especially the terminal ones, slightly constricted; the penultimate segment much shorter than the antepenultimate, and forming merely a transverse slip; the first segment, which forms the peduncle, quadrate, the angles rounded; above deeply channeled down the middle, which gives it a bilobate appearance, beneath carinated and flattened laterally from this carina: the apical segment obtuse and rounded.

Type of the genus *Ænictus ambiguus*, Shuck.

Named from its ænigmatical structure, which participates in that both of *Labidus* and *Dorylus*, from the latter of which, although the neururation of the wings is nearly similar, other parts differ so much, especially the mandibles, prothorax, peduncle of the abdomen and legs, that it would not consistently associate with it, and in all these particulars it completely agrees with *Labidus*, forming a link between the two genera which thus corroborates their affinity*, although their generic disparity is strongly substantiated by the comparative conformation of the male sexual organ, which, as in *Dorylus*, here also has the fornicate lateral valves (the external sheath), which are also fimbriated at their apex. The central process (penis), however here takes the same curve, but higher than these valves, which closely embrace it laterally, and are not more than three-fourths as long as it; this central portion forms, viewed from above, a double parallel tube, separated by a narrow fissure at its extreme apex, but afterwards joined by membrane: the representative of the inner sheaths take here a very different form from what they present in *Dorylus*, for here they are fornicate, excised just within their apex, they then become suddenly dilated, terminating abruptly in an obtuse angle, which points downwards. The horizontal furcate plate beneath is very broad and quadrate, the furcation being formed by two slender acuminate converging spines. This remarkable insect is a na-

* St. Fargeau hints a doubt of this, where he says, "Je ne présume pas, en l'absence du sexe féminin, quelle peut être leur place définitive, et, du reste, l'analogie apparente me porte à les laisser avec les *Dorylus*, et à les placer ici hors de rang, en attendant des éclaircissements sur leurs mœurs." 'Hist. Nat. des Hymenop.' (Suites à Buffon), tom. i. p. 227. But this author has made many mistakes throughout his notice of these genera, and his opinion of them consequently is not at all to be trusted.

tive of India, and thus binds the forms of the Old and the New World together. The genus is, however, as yet incomplete, as I only know male individuals.

Sp. 1. *Ænict. ambiguus*, *Shuck.*

Length nearly 4 lines.

Expansion $7\frac{1}{2}$ lines.

Rufo-testaceus, pubescens: capite (antennis, mandibulisque exceptis) et thorace nigro.

Reddish testaceous, covered with a close silky down; head, with the exception of the antennæ and mandibles, which are of the same colour as the body, black and shining; ocelli placed upon an eminence on the vertex, in a curve; mandibles very long, much curved, somewhat broadest at the base, pubescent externally, and when closed leaving a wide space between them and the clypeus, upon the anterior margin of which the antennæ are inserted in a cavity, the inner carinated edges of which join in the centre of the face, forming a single carina, which extends to the anterior ocellus. Antennæ rather robust, equally thick throughout, the scape not thicker than the flagellum and about one-third its length.

Thorax black, or sometimes pitchy, covered with a close decumbent down, convex, very gibbous at the scutellum, which is quadrate: superior wings with the nervures and stigma brown; the tegulæ testaceous; legs short, slender, testaceous, and covered with long loose hair.

Abdomen testaceous, covered with close decumbent down, with the peduncle wider than the second segment, deeply canaliculated, and of the shape of a saddle reversed, rounded at the base; the terminal segment rounded and obtuse.

Col. Sykes's collection.

A native of Poonah in Bombay, whence it was brought by Lieut. Col. Sykes. I have above amply dilated upon its extremely anomalous structure. The female unfortunately is not known.

Genus 3. DORYLUS, *Fab.*

VESPA, Lin. MUTILLA, Lin., Christ.

Body elongate, cylindrical, more or less pubescent.

Head small, transverse, flat, the face sometimes swollen.

Antennæ short, setaceous, curved, the scape long and stout, inserted near the anterior edge of the clypeus within the inner angles of the mandibles; the scape and flagellum varying considerably in their relative proportions, the former rarely one-third the length of the whole organ, the apex of which rarely extends to the insertion of the superior wings.

Eyes moderately large, globose, very prominent and lateral.

Ocelli placed in a triangle on the vertex, very large and prominent.

Mandibles edentate, much compressed, forcipate, convex externally, and concave within, variable in form and proportion.

Labrum semicircular, occasionally tuberculated and shutting down upon and inclosing the remainder of the trophi.

Maxillæ obsolete?

Maxillary palpi two-jointed, the joints minute, subglobose, abruptly truncated, the terminal one rather the smallest, both having divergent setæ at their apex.

Labial palpi two-jointed and in advance of the maxillary, than which they are rather longer, the basal joint subobconic, the terminal one minute and subulate, and both with divergent setæ at their apex.

Mentum waved laterally and emarginate in the centre.

Labium membranous, triangular.

Thorax subcylindrical, very gibbous at both extremities.

Prothorax extending laterally to the insertion of the anterior wings.

Mesothorax largely developed, advanced considerably beyond the insertion of the anterior wings, gibbose in front and suspended over the prothorax.

Scutellum large, usually transverse, gibbous, rounded at the apex.

Metathorax not largely developed.

Tegulæ small, slender, and linear, but distinct.

Superior wings not so long as the abdomen, with one marginal and two submarginal cells, the first of the latter much longer than the second, and receiving the single recurrent nervure usually near its middle.

Legs short: *coxæ* large, convex beneath and concave above: *trochanters* triangular: *femora* quite glabrous and shining, very much compressed, usually triangular and broadest at the base: *tibiæ* smooth, shining, slender, not so long as the femora, and furnished at the apex with a single calcar, at the insertion of which there is usually a coronet of small spines: *tarsi* longer than the tibiæ and very slender; the basal joint as long as the three following, the fourth the shortest, and the fifth terminal joint supplied with a pair of short stout simple claws, and having a moderately large pulvillus between their fork.

Abdomen elongate, cylindrical, frequently slightly clavate towards the apex, where it curves downwards; the first segment variously formed and separated from the following by a deep incision, forming a sort of peduncle always convex above: the penultimate and antepenultimate segments equal or subequal: the male sexual organ frequently protruding.

Type of the genus *MUTILLA Helvola*, Lin.

This genus is restricted to the old world, and its metropolis appears to be Africa, from the southern extremity of which one species, the type, comes in considerable plenty, which renders it strange that nothing should come with it that might with any probability be associated as the female. But if my assumption should be right as regards the female of *Labidus*, the supposition is that it also has a blind female which never or rarely quits its subterranean abode.

The generic differences throughout this family are strongly confirmed by the structure of the male sexual organs, which have also specific diversities, and thus here obtain a value not usually acceded

to them in the description of insects*. The Rev. Mr. Kirby said, many years ago,—“ The head and its organs are in some degree analogous to the root in plants, for they collect and absorb the nutriment; the truncus may be looked upon as representing the stem, the limbs the branches, the wings the leaves, the abdomen as a kind of calyx, including the fructification. Therefore the great command, ‘ increase and multiply,’ will direct us to those parts which constitute the essence of an insect.” He next says in continuation, “ but these, if it were possible, it would be improper to use for characters.” I introduce them here certainly not as characters, but in confirmation of less tangible characters, thus proving the efficiency of the latter, and as a small contribution to the description of the comparative structure of these organs in insects, which comparative anatomists may not always or even frequently have the opportunity of examining.

In *Dorylus helvolus* this organ consists of two large fornicate valves (the external sheath of the penis, *Burm.*) which are fringed at their apex; within the fornix, and springing from the centre of its base, there is an elongate linear process (the penis) deeply longitudinally channeled both above and beneath, and which extends to the apex of the valves opposite their central division: this division reaches nearly to their base, where these valves have a common origin, and this base forms on each side beneath a convex return, with which an elongate compressed spine (the inner sheath) articulates, having a vertical motion; and these spines curve upwards on each side of the central canaliculated process near its base, where it is also articulated. At the extreme base of this complex organ, and articulating with it beneath, there is a horizontal flat linear plate deeply furcate at its apex, the furcation half the length of the plate, which also extends to the apex of the two large superior lateral lobated valves.

It is a circumstance worthy of remark, that wherever I have had the opportunity of examining and comparing several individuals of a species throughout the family, I have found so great a uniformity of size that I have not detected a difference of half a line even among the larger ones. Thus although the characters that separate them are sometimes very obscure, and without patient examination elude discovery, my experience seems to support an opinion that wherever great differences of size are found between specimens of these genera, the presumption is, that characters exist which will individualize them, although too recondite for instant detection, yet so tangible when found as not to admit of the least doubt of their specific value,

* Monog. Ap. Angliæ, vol. i. p. 39. 1802.

and which become corroborated, as I observe above, by the form of the male sexual apparatus. The species in the present genus seem to separate themselves into groups, for there is less uniformity of general structure than is commonly found in a *natural genus*, and the form of the peduncle of the abdomen appears in some degree to influence the form of other parts. The groups they resolve themselves into are these, which may be thus characterized by the form of the peduncle alone or in conjunction with the mandibles, viz. :

1st. Peduncle cup-shaped, nearly as large as the following segment.

Sp. 1.

2nd. Peduncle cup-shaped, much smaller than the 2nd segment.

Sp. 2. and 3.

3rd. Peduncle quadrate, mandibles slender and much acuminate.

Sp. 4, 5, 6.

4th. Peduncle quadrate, mandibles broad and nearly triangular.

Sp. 7, 8, 9, 10.

Sp. 1. *Dor. nigricans*, Illiger.

Length 13 lines.

Expansion $21\frac{1}{2}$ lines.

Nigricans, *brunneo-holosericeus*, *abdominis petiolo acetabuliformi*, *segmento secundo paulo minor*.

Illiger, Mag. der Ent. 1^{ter}. Bd. Seit. 188. 18.

Fabricius, System. Piez. 427. 2.

Latreille, Gen. Crust. et Ins. 4. 124.

——, Nouv. Diction. d'Hist. Nat. 2^e ed. 9. 556.

Blackish brown, velvety, elongate cylindrical: head comparatively large, slightly convex towards and beneath the vertex; the ocelli are comparatively small and are placed in a triangle; eyes lateral, small, ovate convex: antennæ short, setaceous, the scape rather more than one-third the length of the organ; mandibles elongate, narrow, much acuminate, and with the antennæ and legs of a dark castaneous.

Thorax very robust, covered with a bright brown silky pubescence, with two abbreviated longitudinal central lines in front: scutellum slightly gibbous, broad: superior wings with their nervures blackish, and the surface clouded with brown, the recurrent nervure inserted just within the centre of the second submarginal cell, the cubital nervure extending straight to the angle of the second submarginal: femora elongate, triangular, subacuminate at the apex.

Abdomen cylindrical, blackish brown, the margins of the segments a little paler: the peduncle cup-shaped above, villose beneath, nearly as large as the second, the terminal smooth and abruptly truncated at its extreme apex, which is a little reflected.

In most Collections.

This remarkable species, which in the size of its head and peduncle and smallness of its eyes differs from all its congeners, is from Sierra Leone.

[To be continued.]

(p. 315)

XXXI.—*Miscellanea Zoologica*. By GEORGE JOHNSTON, M.D., Fellow of the Royal College of Surgeons of Edinburgh.

DESCRIPTION OF A NEW GENUS OF BRITISH ZOOPHYTE.

THE kind liberality of my friends, interested in similar pursuits, has lately furnished me with several undescribed species of British zoophytes; and there is amongst them one, in some respects, so remarkable and eccentric, that it seems no more than just to its discoverer that an early description of it should be placed on record. It was sent to me by Mr. Wm. Bean of Scarborough, who was fully aware of the novelty and singularity of its characters, which raise it indisputably to a generic rank in its family. Not for this reason however, but because of the very great number and value of the discoveries of that well-known naturalist, I propose to associate this zoophyte with his name and memory; and in doing so I know that I shall confer a gratification on many of his fellow-labourers; and I keep very clearly within the precincts of the rule, which forbids us to confer on a genus the name of an individual unless his services shall have honestly won him that compliment.

Class ZOOPHYTA.

Order ASCIDIODA. Family VESICULARIADÆ.

Genus BEANIA.

(Det nomen Dom. Gulielmus Bean, zoophytorum investigator peritissimus.)

CHAR. Polyparium phytoideum, filiforme, repens, corneum; surculis tubulosis, diffuse ramosis, vesiculiferis. Vesiculæ singulatim sparsæ, erectæ, magnæ, ovatæ, uno latere spinosæ.—Polypi ignoti.

— Polypidom confervoid, horny, the shoots creeping, filiform, tubular, irregularly divided; the cells very large, sessile, erect, scattered and solitary, ovate with a double spinous keel on one side. Polypes unknown.

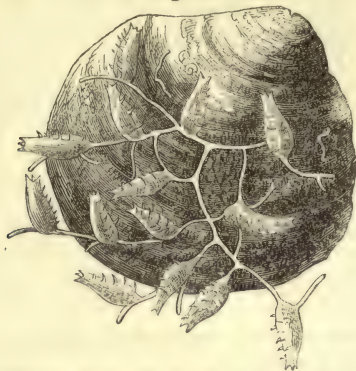
Species B. MIRABILIS.

Habitat in mare Britannico. Scarborough, very rare, Wm. Bean, Esq.

The only specimen which I have seen of this very remark-

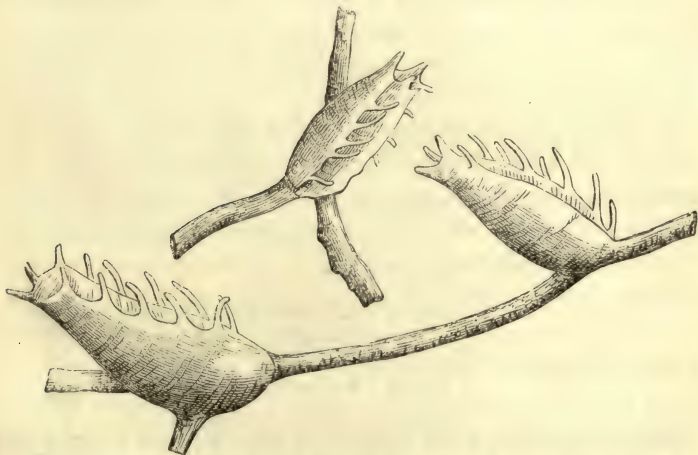
able coralline is parasitical on the upper valve of an *Anomia Ehippium* that is likewise almost crusted over with two or three species of *Lepralia*. It is large enough to be easily seen

Fig. 1.



with the naked eye, but of such minuteness that it may be readily passed over unnoticed, excepting by a naturalist of the practice and acuteness of its discoverer. The stalk creeps over the surface of the shell, to which it adheres loosely, and is divided at intervals without order or regularity,—the shoots forming sometimes a long simple thread, while at other places they anastomose freely. The shoots are very slender, filiform,

Fig. 2.



smooth, colourless and pellucid, tubular, unjointed and horny; and in general they are slightly swollen at the origins of the

cells. These appear to be rather seated on the tube than a development of it, though it is probable that there is a direct and free communication between them. The cells are scattered and always single, half a line in height, sessile, ovate, bulging below, horny, vesicular, slightly compressed, smooth, with a double keel down one side, each keel armed with from five to seven spinous teeth, placed sometimes nearly opposite, and in other instances alternating. The aperture is quadrangular, terminal and wide, half closed with a thin membrane, and furnished at each angle with a spinous denticle.

Though the polypes are unknown, yet there can be little hesitation, from the structure of the polypidom, in prognosticating their affinity to those of the family Vesiculariadae.

Fig. 1. *Beania mirabilis*, represented as it appears on one part of the shell, considerably magnified.

Fig. 2. Three vesicles, more highly magnified, to show their characters more exactly.

XXXII.—*Descriptions, &c. of some rare or interesting Indigenous Insects.* By JOHN CURTIS, Esq., F.L.S., &c.

MOST of the following species have been named and recorded in the 'Guide to an Arrangement of British Insects;' but as no opportunity offered of describing them during the progress of the 'British Entomology,' some of them have been noticed by other writers, who had not consulted the specimens, which will render it necessary to give a few definitions, which it is hoped will make it easy to identify them in future. The numbers refer to the Guide, and all the insects are in the cabinet of the author of the above works, excepting the *Hygrotus* and *Chrysomela*.

Order COLEOPTERA.

Fam. CARABIDÆ.

Genus 28. DROMIUS.

14. *angustatus*.

My specimen is $1\frac{1}{2}$ line long, but in other respects it agrees with *D. truncatellus*, and I suspect the *D. maurus* of Sturm is only a variety of the same insect.

Genus 48. *BRADYTUS*.

5. *marginatus*. Elongate-ovate, piceous; head rather small, strongly marked: thorax twice as broad, transverse, semiovate, being broadest at the base, on which there are two punctured striæ, the outer one forming an oblique sharpish line externally, a faint channel down the middle; sides convex, margined, bright ferruginous, depressed towards the basal angle: elytra broader, oval, striæ strong and crenated in the male; duller and faintly punctured in the female: palpi, antennæ and legs bright ferruginous: length 4 to 4½, breadth 1½ to 2 lines.

Having taken a male on Boxhill, Surrey, in August, I now possess the sexes of this interesting species, and find that it connects *Bradytus* and *Amara*. The habit and structure of the legs are perfectly those of the latter group; but the head and thorax are more strongly marked. The palpi exhibit a very remarkable character; the terminal joints are compressed and truncated in the male, whilst they are fusiform and longer in the female, but it is probably accidental.

Dejean's description of **Amara patricia*, Creutzer, agrees with my insect; but it is very unsatisfactory to find him referring to Sturm's two figures of *A. mancipium* and *A. equestris*† as examples of Creutzer's insect, since the former appears to be a typical *Bradytus* and the latter a true *Amara*. It must be remembered that Sturm's dissections of the genus *Amara* are taken from *Carabus fulvus* of DeGeer and not from *Carabus consularis* as stated by Mr. Stephens.

Genus 49. *AMARA*.

23. *septentrionalis*. Elliptical, shining brassy green: thorax semiovate, being narrowed before, base punctured, with 2 shallow foveæ on each side, and a fine channel down the centre; elytra scarcely wider than the thorax, but more than twice as long and linear, striæ firm and delicately punctured, the 2nd abbreviated: trophi ochreous, palpi piceous: antennæ brown, 3 basal joints bright ochre: legs ochreous, thighs and 4 hinder tarsi piceous: length 3 lines, breadth 1½.

The only specimen I have seen of this pretty species was taken in Scotland, and presented to me by Mr. Lyell.

Genus 76. *TACHYS*.

9. *minimus*. Deep dull ochreous, base of head and apex of antennæ darker, trophi very pale; eyes black; thorax with a faint dorsal channel; elytra with several obscure striæ, the 2 sutural ones the strongest: length 1 line.

Very similar to *T. minutissimus*, of which it may only be a pale

* *Spécies général des Coléoptères*, t. 3. p. 502.

† Sturm's *Deutschlands Fauna*, vol. vi. tab. 141. figs. C. and D.

variety. It was found under a stone on the beach at Sidmouth, Devon, by Mr. Marshall, the beginning of March.

Fam. DYTICIDÆ.

Genus 90. HYGROTUS.

- 1^a. *bisulcatus*. Ovate-conic, slightly pubescent, reddish-brown; base of antennæ and thorax ochreous, the latter pitchy at the base, and slightly punctured, with an oblique channel on each side: elytra minutely punctured, with a faint line of punctures on each side of the suture, which is darker, and a channel on each side of the base meeting those on the thorax: length $\frac{2}{3}$ of a line.

This singular little species was taken on Cambridge Fens by the Rev. J. L. Brown of Norwich. It seems to form the transition from *Hyphydrus* to *Hygrotus*.

Fam. PARNIDÆ.

Genus 101. PARNUS.

3. *montanus*.

Is only a pale ash-coloured variety of *P. prolifericornis*, several of which I found under stones upon the mountains near Ambleside.

Fam. MYCETOPHAGIDÆ.

Genus 160. TETRATOMA.

2. *pallida*. Shining ochreous, regularly and minutely punctured and slightly pubescent: head brownish; thorax with two large punctures or foveolets at the base: elytra thrice as long as the thorax, with a faint greenish shade: $1\frac{1}{4}$ line long.

Taken in Oct. amongst dry grass at Southgate by Mr. F. Walker.

Fam. ANISOTOMIDÆ.

Genus 164. PHALACRUS.

- 7^b. *castaneus*. Oval, slightly depressed; black, posterior angles of thorax and elytra castaneous, the latter with nearly 20 regular lines of punctures: underside and legs subpiceous: length 1 line.

Genus 167. LEIODES.

- 1^b. *vittata*. Globose-ovate, shining, bright and deep ochreous; eyes, tips of mandibles and upper side of club of antennæ fuscous; head and thorax minutely punctured, the former ferruginous; elytra punctured, with rather remote lines of punctures also, with a rosy tinge and a long conical fuscous stripe on each, probably arising from the dark wings folded beneath: length $\frac{5}{8}$ of a line.
2. *latifrons*. Oval, shining, ochreous; mandibles prominent, tips black; eyes gray; head and thorax broad, finely punctured; elytra scarcely broader than the thorax, transversely strigose, with very fine lines of punctures and a channel on each side of the suture: hinder thighs with a very strong spine beneath near the apex: length $\frac{5}{8}$ of a line.

L. vittata is characterized by its hemispherical form, whilst *L. latifrons* is ovate and somewhat linear : it is separated from *Anisotoma spinipes*, Gyll. by its paler colour, elytra with lines of punctures, and ochreous club of the antennæ. Both species I took in Norfolk, as well as *L. rufa*, which is only a variety of Gyllenhal's insect.

Fam. STAPHYLINIDÆ.

Genus 191^b. PELECYPHORUS, Nord. EURYPORUS, Erich.

2. *picipes*, Payk.

This species, recorded as *Astrapæus basalis*, proves to belong to a new genus, and will be found described in Gyllenhal under the name of *Oxyporus picipes**.

Genus 226. STENUS.

46. *basalis*. Glossy black, with a few ochreous hairs, thickest on the face, which is very rugose ; thorax obovate, truncated at the base, very coarsely punctured as well as the elytra, which are quadrate convex and twice as broad ; abdomen not margined, rather slender and punctured : base of tibiæ bright ochreous : antennæ reddish-brown : length 1 line.

The only specimens I have seen were found on mud, in the New Forest, in May, by Mr. Dale.

Genus 229. SUNIUS.

5. *unicolor*. Dark brown, pilose, thickly and minutely punctured : thorax reddish-brown, orbicular, the sides slightly compressed : elytra oblong, sericeous : abdomen piceous, margins of segments and apex ochreous, trophi of the same colour ; antennæ and legs more ferruginous : length 1½ line.

Fam. CORTICARIDÆ.

Genus 246. MONOTOMA.

2. *gracilis*. Narrow, brown, slightly glossy ; head and thorax punctured, the former with acute basal angles, the latter with the anterior angles tuberculated, and a large shallow fovea towards the base, elytra reddish brown, slightly pubescent, with lines of punctures ; antennæ and legs bright ochreous ; head and thorax sometimes rufous : length $\frac{2}{3}$ to $\frac{3}{4}$ line.

Mr. Haliday has taken this species at various seasons near the bay of Belfast.

Fam. CERYLONIDÆ.

Genus 248^c. TEREDOSOMA, Curt.—Ips. Oliv.

Head short, semiorbicular : eyes lateral. Thorax long cylindric, tapering a little to the base : scutell minute, orbicular. Elytra scarcely broader than the thorax but twice as long, elliptic, cylindric ; wings ample. Legs short, compressed ; tibiæ dilated towards the apex, with a few minute spines ; tarsi longish, 4-jointed, 3 basal joints small ; claws simple.

* Insecta Suecica, vol. ii. p. 443.

Antennæ short, inserted before the eyes, capitate, hairy, 11-jointed; basal joint stout, hatchet-shaped, 2nd obovate, 3rd as long and slender, 6 following obovate-truncate, increasing in diameter, 10th and 11th forming a compressed club, the former semiorbicular, the latter suborbicular. *Labrum* broad, short, ciliated and pilose. *Mandibles* broad at the base, tridentate, with a hairy membranous internal margin. *Maxillæ* with a long, slender, hairy internal lobe and a broad but shorter external one terminated by an oval brush of hairs. *Palpi* somewhat long, stout and 4-jointed, basal joint small, 2nd semioval, 3rd transverse, 4th the longest, ovate-conic, slightly truncated. *Mentum* trigonate-truncate. *Lip* small suborbicular. *Palpi* short and stout, attached to contiguous scapes, biarticulate, basal joint semioval, 2nd ovate-conic, slightly truncated.

1. *nitida*, Payk.—*cylindrica*, *Oliv. v. 2. No. 18. pl. 2. f. 16.*

Black, shining, punctured: elytra castaneous-black, with faintly punctured striæ, antennæ and legs ferruginous: $1\frac{3}{4}$ to 2 lines long.

For specimens of this recent discovery in Britain, I am indebted to Mr. Trueman, who took them the end of June in Sherwood Forest, Nottinghamshire, in the trunk of an old oak tree.

Fam. ELATERIDÆ.

Genus 309^d. APLOTARSUS, *Step.* *Limonius Esch.*

24. *maritimus*. Antennæ with 3rd and 4th joints of equal length: terminal joint of palpi obovate, compressed and subtruncate: head margined in front: tarsi tapering, somewhat depressed, black, shining, with short ochreous pubescence and minutely punctured: thorax with the sides very convex and the basal angles very acute; spine of sternum long and slender: elytra broader; depressed, inclining to slate black, firmly striated, apex entire: tarsi piceous or reddish brown: length 2 lines, breadth $\frac{2}{3}$.

This very distinct species does not perfectly associate with the *Aplotarsi*, as will be seen by comparing the above description with that in British Entomology, of *A. aterrimus*, plate 694, but I do not find any other group better adapted to receive it. I first discovered *A. maritimus* under rejectamenta at Broughton, Lancashire, 30th of June 1827, and Mr. Little has since taken it at Raehills.

Genus 309^a. CARDOPHORUS.

- 41^b. *formosus*, Curt. Black, shining, variolated; thorax entirely rufous; elytra with strongly punctured striæ, having a slightly curved bright ochreous fascia near the base and a straighter one beyond the middle: legs ferruginous: length 3 lines, breadth $1\frac{1}{4}$.

The only specimen I have seen of this beautiful species was taken from the roots of some celery in a cottage garden near Wentworth

House, Yorkshire, and presented to me by Mr. Simmons, who unfortunately had laid a book upon it whilst on the setting-board, by which accident the antennæ were broken off and lost.

Fam. TELEPHORIDÆ.

Genus 188. TELEPHORUS.

20. *Æthiops*. Black, shining, clothed with short ochreous pubescence : trophi and base of antennæ beneath ochreous : thorax transverse, a little narrowed before, sides margined and lurid : elytra thickly punctured : legs piceous, base of tibiæ ochreous : 2 to $2\frac{1}{2}$ lines long.

Having taken many specimens of this insect, none of which agree with Fabricius's description of his *C. pulicaria*, nor with Olivier's figure, which has the entire border of the thorax ochreous, I have retained the name I first proposed. They were found on rushes and grass the middle of June 1827, on the sides of Red Skrees, a mountain near Ambleside, where I also discovered the true Linnæan *T. obscurus*, for which other varieties had been substituted in the London cabinets up to that period.

21^b. *apicalis*.

This is probably a variety of *T. fuscicornis* of Olivier : the antennæ and palpi are darker, and it is distinguished by a blackish stripe down the four anterior thighs and tibiæ.

27. *unicolor*. Long and narrow : clothed with short pubescence : entirely ochreous excepting the eyes, which are black and prominent, and the fuscous wings : thorax bright, shining, not transverse ovate, the base truncated, all the angles rounded : elytra duller, thickly punctured, with 2 obscure longitudinal lines on each : 4 lines long, 1 broad.

As this does not agree with Paykull's description of *C. pilosa*, I have retained my name. It was taken on the wing in the evening in Darent Wood.

Fam. BOSTRICIDÆ.

Genus 331. BOSTRICHUS.

3. *Waringii*. Ochreous, shining ; head black, concave ; thorax pale ferruginous, scabrous, with longish ochreous hairs in front ; elytra punctate-striate, the suture piceous, an elongate oval space on the outer margin, and a stripe down the middle of each beyond the centre, but not reaching the apex, piceous also ; underside blackish, legs deep ochreous : length $1\frac{1}{2}$ line.

I am indebted to Mr. Waring for my specimen, which he took in a house in Bristol. It is allied to *B. domesticus*, Linn.

Fam. CURCULIONIDÆ.

Genus 355. BALANINUS.

12. *scutellaris*.

This appears to be only a var. of the female of *B. Brassicæ*, Fab. with a white scutellum.

Genus 356. ANTHONOMUS.

5^b. *brunnipennis*. Ochreous-brown, glossy, with short ochreous pubescence: rostrum ferruginous, piceous at the base, faintly striated; antennæ fuscous, apex of basal joint ochreous: thorax thickly and coarsely punctured: elytra paler, strongly punctate-striate: thighs ochreous at the base, with a minute tooth beneath: 1 line long, including the rostrum.

I swept four specimens of this new species off heath the 16th of Aug. ascending the Fairie-hills in the Isle of Arran.

Genus 361. PISSODES?

4. *pygmæus*. Deep shining black, sparingly clothed with minute white scaly hairs: club of antennæ hoary; thorax with variolose punctures; elytra firmly striated, a little variegated with white scales towards the apex: legs and underside most thickly clothed with them: length $\frac{3}{4}$ of a line.

I have entirely forgotten where I found the 3 specimens of this very distinct little insect which are in my cabinet. At first sight they look very like *Molytes*, but I have little doubt of their belonging to the genus *Pissodes*.

Genus 362. HYPERA.

23. *fumipes*. Black, variegated with cinereous and cupreous scales: antennæ ferruginous, club piceous, funiculus 6-jointed: thorax with a stripe of scales on each side: elytra slightly bristly towards the apex, tessellated with black, especially down the suture and towards the extremity; legs ferruginous, sometimes inclining to fuscous, especially the thighs: length $1\frac{1}{2}$ line, including the rostrum.

I possessed only a single specimen when I gave the name of *fumipes* to this species, which was taken I believe by Mr. Babington near Cambridge. I have subsequently received others from Mr. Walton, which have ochreous and ferruginous legs, depending upon their age. The 6-jointed funiculus readily distinguishes this small species from the rest of the *Hypera*.

Genus 376. POLYDRUSUS.

6. *sericeus*.

I detected a female under a stone, on the banks of the Thames near Gravesend the 1st of June 1839, and Mr. Walton subsequently found many more specimens.

Genus 384. APION.

13. *Curtisii*, Kirby. Narrow and convex, chalybeous black, shining, very sparingly clothed with white hairs: antennæ with the two basal joints subferruginous, joints of funiculus globose: rostrum smooth and shining, face and thorax punctured, the latter cylindric, slightly attenuated, with an oval pit at the base: elytra elongate-ovate, not twice as broad as the thorax, with delicate striæ and series of white hairs upon and between them: length, including the rostrum, not 1 line, breadth scarcely $\frac{1}{3}$.

The whole insect is convex, head, thorax and elytra, and not at all depressed as in *A. pubescens*, to which it is most nearly allied: it is further distinguished by the ferruginous base of the antennæ, the globose and not oval joints of the funiculus, and the rostrum is smooth and polished. Mr. Kirby drew up a description 20 years since from this unique specimen, which I took in Norfolk, with a view to publish it under the above name, but Mr. Stephens has merely described a variety of a common insect which he fancied was the same.

Fam. SALPINGIDÆ.

Genus 245^b. LISSODEMA HEYANA.

Will form a subgenus with **Sphæriestes 4-pustulatus* and *denticollis*, principally distinguished by the club of the antennæ being tri-articulate and not 6-jointed: the structure of the tarsi justified my placing *Lissodema* before the *Heteromera*, and the position of *Salpingus* seems to be doubtful.

Fam. CHRYSOMELIDÆ.

Genus 429. EUMOLPUS?

3. *Hobsoni*. Castaneous, very thickly punctured, clothed with short depressed ochreous hairs: antennæ ochreous, longer than the thorax, disc of thorax black: elytra deep ferruginous, with a long black patch on the suture, a large spot at the base, another on the shoulder, 2 long black spots at the middle and 3 towards the apex, forming interrupted fasciæ: length $1\frac{1}{3}$ line, breadth $\frac{3}{4}$.

This insect, which will probably form a new genus, was taken by the late Mr. Hobson of Manchester, under the bark of a poplar-tree at Houghend Clough near Charlton.

Genus 431. CRYPTOCEPHALUS.

20. *ochraceus*. Smooth, shining, deep bright ochreous; antennæ blackish towards the apex; palpi piceous; face slightly punctured, with a channel down the middle: thorax broad with the margins and a line down the

* Curtis's British Entomology, folio 662.

middle yellow ; scutel sometimes piceous : elytra yellow-ochre, suture piceous, humeral spot brown ; striæ punctured, brown and oblique next the suture : underside black : length $1\frac{1}{4}$ line.

This little insect, which has been confounded with *C. pusillus* of Fabricius, has a wider and longer thorax and is well distinguished by its dark palpi and channeled face. I always find it in August on grass or herbage, and have never met with any variety as in the allied species, which is common on sallows in June. *C. ochraceus* is abundant at the side of the Avon near St. Vincent's Rocks ; the sand hills, Sandwich ; at Mickleham ; Bungay Common, Suffolk ; and Mr. Dale has met with it near Carisbrook Castle.

Genus 433. CHRYSOMELA.

22. *Sparshalli*. Smooth, shining, violaceous ; thorax margined, with a few large punctures on each side : elytra orange colour ; sparingly and irregularly punctured, the punctures all black, scutellum and suture also black : length 4 lines.

Taken near Epping by Mr. Doubleday, and is preserved in the collection of the late Mr. J. Sparshall of Norwich.

XXXIII.—*Information respecting Botanical and Zoological Travellers.*

Mr. Schomburgk's recent Expedition in Guiana.

[Continued from p. 35.]

It has been suspected that there exists a species of Otter in the rivers of South America which is undescribed. The difficulty connected with procuring these animals, and the absence of references to consult whether there were any specific differences between the two species which inhabit the rivers of Guiana and those which are already described, prevents me from giving it as my firm opinion that the Otters of Guiana are identical with *Lutra brasiliensis* of Ray, and *Lutra enudris* of F. Cuvier. Naturalists know very little about the habits of the South American Otters, nor is it ascertained that the species which is described by Azara is identical with the *Lutra brasiliensis*. The note which I select from my journal, although meagre in itself, may prove nevertheless acceptable, until we have a more perfect knowledge of their character.

During our first ascent of the river Essequibo we did not meet any Otters until we had passed the river Siparuni, and approached the island Tambicabo. We saw first only one, swimming like a dog, with the head and neck out of the water ; but more and more made their

appearance, until their whole number amounted to about twelve. They were approaching our canoes, now raising themselves partly out of the water, accompanying this motion with a loud snore or an angry growl, or diving rapidly under water, and reappearing a few moments after some distance behind our canoes. Our Indians commenced a shout, striking repeatedly with the hand against their throat, by which a sound not unlike to the growl of the Otter was produced. This attracted their curiosity; and ranging themselves in a line, they came nearer, and were within the reach of the gun, when the very act of raising it induced them to dive, with the exception of the furthestmost, which, more courageous than the others, continued to advance until it received the discharge. It sunk immediately; but although the water was coloured with blood and proved that it had been wounded, we did not succeed in securing it.

We met them afterwards frequently, but always in small societies; and the first token that they were near us and that we had been reconnoitred by them, was that peculiar snore which may be heard at some distance. I have known them to come so near our canoes that the Indians attempted to strike them with the paddles. This was, as it might have been expected, a vain attempt, as they dive with the greatest rapidity, and are able to remain under the water for a considerable period before they rise to take breath. We frequently surprised them while occupied in feeding upon the fish which they had caught: their retreat was then most rapid, but always in single file and directed towards the river, into which they glide dexterously, and where they dive under instantly for greater security. We have seen them ascend the banks with equal dexterity. They have their certain haunts, where, when they have been successful, they devour their prey, leaving the heads, tails, and fragments of fish, which infect the environs with an insupportable smell. The Otters of Guiana choose for their retreat holes near the banks of the river, but they are known sometimes to take refuge in hollow trees. Their haunts are easily known by a strong and disagreeable smell, in some instances so strong that we increased by all means in our power the speed of the canoes to get out of its precincts. The lesser species hunt in small packs of eight or ten, and swim mostly against the stream; of the larger species I have seldom seen more than two together. As they dive to a great distance and are able to remain under water for six to eight minutes, what fish passes over them at that time is sure to fall a prey to their voracity; they seize them at once by the belly and drag them on shore, where they are deposited while they continue their pursuit. The Indians, who are aware of this, watch their success in

ambush, and secure what the Otters bring ashore. They attack sometimes fish of considerable size. We watched a pack of Otters at the Great Cataracts of the Corentyn, where, at the basin which one of the cataracts formed, they appeared to carry on their pursuits with great success. One had secured a Haimura at least from ten to twelve pounds weight, and carried it in its mouth to a rock which was partly over water. Here it began devouring its prey without taking much notice of us, although we were not twenty yards from it on the opposite shore. It did not care for our shouting; its success was however disputed by the Indians, who got into the canoe and paddled so rapidly towards the rock, that the Otter saw itself obliged to retreat and to leave the better half of the fish to the Indians. Although the Otters were numerous round the rock, none of them showed any intention to share the prey with the successful hunter or to dispute its possession.

I have already alluded to their having their holes on the edge of rivers, sheltered by the impending bank. Every rock in the vicinity of their residence bears the mark of their excrements; and their feeding-places are so devoid of vegetation, if we except the larger bushes and trees, that they cannot be mistaken, even if the number of scales and fish-bones did not point out the frequency of their visits. A complete path leads up to these places, which, in consequence of their ascending and descending in single file, is hollowed out.

The young remain for a considerable time under the protection of their parents, the mother teaching them to plunge and dive at approaching danger. Abbé Ricardo, who wrote in the middle of last century a treatise on the South American Otter, and who, in order to study their manners the more effectively, caused a large cage pond to be erected in Caraccas*, relates, that while the parent Otters are in existence, they do not suffer the young to propagate their species. I cannot vouch for the truth of this assertion, nor could I make myself sufficiently understood to the Indians to elicit their corroborative testimony to that effect; but thus much is certain;—that in the same community there are Otters of all sizes, and apparently of three or four different generations.

We had entered the upper Essequibo by its tributary the Cuyuwini, and passed at the foot of a ridge of mountains, when we observed on a large ledge of rocks a family of Otters, consisting of about fifteen, including old and young. At our approach they broke

* His treatise is said to be still in existence and in good preservation in the cathedral of Caraccas.

out into their peculiar noisy cry, and the parents seizing the young with their mouth they plunged into the water and disappeared,—and having placed their young in security, we saw them shortly after reappearing at the head of our canoe. They raised themselves with half their body out of the water, snoring for rage and showing their formidable teeth. At approaching danger or when apprehensive of it, they collected in a body, deputing the most courageous in advance; as our canoe came nearer, they sank under as if by a preconcerted sign, and appeared the next moment within a few yards of it. We saw nothing again of the young; but the adults and larger-sized young ones accompanied us, threatening and snoring, until no doubt we were so far out of reach of their stronghold that they considered their progeny now safe. In other instances, when we attempted to find out their holes, they became so outrageous that they bit our paddles and left the print of their teeth. The Indians know nevertheless how to surprise the young ones, who are then taken home alive, and become in a short time so tractable that they follow their masters like dogs. I have seen them frequently in the Indian cabins, where they were fed on fish, meat, and fruits. In two different instances I possessed one myself, but they both met with an untimely death. The first was left at the water's edge on breaking up our camp, and not missed until evening, when the distance was too great to return for it; and the second was given to the care of an Indian woman from the interior, who visited the coast for the first time in her life. She had been accustomed to keep the young Otter in a large open basket, which she placed in the river at a short distance from shore, fastening it to a stake for greater security. Unacquainted with the rise of the water caused by the flood-tide, she did the same at the lower Corentyn; and we did not become aware of it until our attention was attracted by her distress, when she observed the water several feet above the utmost point where the string would have allowed the cage of the poor Otter to float. In both instances the young Otters were quite tractable and attached to those who nursed them. Their cry when angry or in pain was most plaintive, sometimes piercing and disagreeable. They appeared to be fond of being carried into the water, and would float motionless, their head merely above the surface.

In Colombia the hunting of the Otter forms a great amusement, and is continued for a considerable period. In the month of May the parties assemble, and having ascended the rivers and falls until they reach the clear waters without current, they encamp. The dogs which have been trained for the purpose of hunting the Otter

are taken in a light canoe, which is manned by the hunters, each armed with an otter-spear, barbed like a harpoon and provided with a handle about ten feet long. An experienced Indian occupies the bow and cheers the dogs, who no sooner wind the game than they give cry. On arriving at the burrows or *Calle Pero* (Otter city), the land party divide into three: one watches, the other occupies that part at the bank of the river which contains the holes, while the third pokes his spear into the holes to eject the occupants. As soon as an Otter is started the hounds are again in full cry; and some of the smaller species of dog, of which there are several in the canoe, are let loose to dive after it: in this they relieve each other; as soon as one is up another goes down; and although the Otter has larger lungs than most other quadrupeds, and can remain comparatively for a longer period under water, it is at last obliged to seek for shallow water or the shore, where the hunters are ready to despatch it with their spears. After the old Otters have fled, the young ones retreat to the uppermost recesses of their holes, where they are dug out, and secured for the purpose of taming; or, which is the case more frequently, they are killed by a slight blow on the forehead.

When hard pursued on land, they frequently double or evince other cunning tricks to elude their pursuers. I shall never forget the sight of an Otter-hunt in the river Tacutu. Although almost crippled by the merciless bites which the sand-flies had inflicted during my stay in Esmeralda, urgent business made it necessary that I should proceed after my arrival in Fort São Joaquim without delay to Pirara. I could neither ride nor walk, and the rivers were then so low that it proved impossible to ascend the Tacutu in a larger canoe: a small hunting-craft, which afforded sufficient room to stretch myself horizontally, and which could be dragged by main force over shallows and sand-banks, offered the only means for executing my design.

We were thus toiling one morning through a small channel, bordered on both sides by sand-banks, when we observed before us a pack of Otters. Our canoe was immediately drawn across, which thus completely barricaded the outlets; while some swift-footed Indians, armed with bludgeons, cut off their retreat by the entrance. The channel expanded and deepened in the middle, and this small basin became now the stronghold of the Otters, into which the Indians rushed for attack; but in spite of their exertions, perhaps intimidated by their furious defence, the adult Otters all escaped, except one, which was now completely hemmed in, and which by every stratagem attempted to escape its assailants. It now plunged into the water, sank under, re-appeared, sought its safety on shore,

running with rapidity over the sand-bank, although apparently little calculated for it, doubled its track with much cunning, and seeing its attempts frustrated by the wily and light-footed Indians, rushed anew into the water. The dormant savage nature of the Indians once roused, no barrier can be set to it. I had been left in the canoe an unwilling spectator. Much as I found myself amused in the commencement of the hunt, now that their united endeavours to slay fell upon a solitary individual whose intrepidity and cunning had as yet frustrated the execution of their murderous design, it awakened pity. But their blood was up; orders as well as entreaties proved in vain; and perhaps annoyed at the escape of the others, they appeared determined to sacrifice this one to their vengeance for ill success. Its tenacity of life was astounding; it had received several wounds with a cutlass, and succeeded nevertheless for some time in evading the mortal blow, until, chased anew upon the sandbank, it was transfixed by a pointed pole and despatched. It measured about five and a half feet in length, including the tail, which was seventeen inches and a half. The fur was of a dark mouse-colour on the belly and nearly black on the back; the head of a mouse-colour, and on the breast was a large cream-coloured spot; the snout short, whiskers strong, teeth large and powerful, feet short and webbed, tail flattened. Its upper coat of hair was rather coarse, but under it was a coat of the finest fur of a lighter colour. This was the only adult specimen which fell into my hands during my journeys in Guiana, and the want of a fuller or systematic description must be ascribed, partly to the state of suffering in which I then was, and partly to the smallness of the canoe to which I was restricted, and which prevented me from taking with me anything but the most indispensable articles, to the exclusion of any materials for making the necessary use of its capture. It is nevertheless my opinion that the larger species is identical with *Lutra brasiliensis* of Ray and Geoffroy, or Linnæus's *Mustela lutris brasiliensis*, Buffon's *Sarcovienne de la Guyane*.

I estimate the length of the smaller kind at about four feet, of which the tail is thirteen to fourteen inches. They are of a light mouse-colour, rather reddish on the belly, with the white spot on the breast. In their habits, appearance, and mode of living, they exactly resemble the larger species, and are found in the same situations; but while that species is seldom found in societies, and generally only in pairs, the smaller is decidedly gregarious. I have never succeeded in procuring an adult specimen of the latter for examination. Their head appears broader than in the former species.

They are equally destructive as the European and Canadian Otters; and, as their depredations continue the whole year, their haunts being never frozen over during the period when Otters of the colder zones feed upon terrestrial animals,—their food is restricted to fish alone, and old Izaak Walton would no doubt have found additional cause to bestow hard names upon these “villanous vermin.”

The fur of the Canadian Otter forms an important article of commerce, and seven to eight thousand skins are annually imported by the Hudson's Bay Company alone. The skin of the Otter of Guiana has, by competent judges, been pronounced equal in quality; and it might prove of advantage to hunt it for the sake of its skin. General Parr's cavalry used them for pistol covers and foraging regimental caps.

The Arawak Indians of Guiana call it *Assiero*; the Caribisi, *Avaripuya*; the Tarumas, *Carangueh*; the Warraus, the smaller species *Etopu*, the larger *Itsha-keya*; the Macusis, the first *Dura*, the latter *Maparua*. In the colony they are known by the name of Water-dogs, bearing some resemblance to the canine race when swimming.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

A Manual of the Land and Freshwater Shells of the British Islands, with Figures of each of the kinds. By William Turton, M.D.
A new Edition, thoroughly revised and much enlarged, by John Edward Gray, F.R.S. London, 1840. 12mo.

Dr. Turton's 'Manual' has long been known as a useful companion to the student of British land and freshwater shells, although in its original state it must be admitted to have been defective in much of that varied information which the more advanced state of our knowledge in this, as in other departments of natural history, imperatively demands. In the present edition Mr. Gray (on whose recent appointment to the Keepership of the Zoology in the national collection we have to congratulate the Museum and the country) has fully supplied the deficiency, and has produced a work of a very different and far higher character, which except in name, in a portion of the descriptive letter-press, and in the greater part of the figures accompanying it, may be regarded as entirely new.

Mr. Gray's 'Introduction' includes, among other interesting matter, a detailed account of no fewer than 50 species of land and

freshwater shells which have been erroneously, as he believes, introduced into the British list, with his reasons for their exclusion ; an outline of the geographical distribution of the native species, both with reference to other parts of the world and to the topographical divisions of our own country, accompanied by a tabular view ; notices of the localities which different species select ; an enumeration of the fossil species belonging to land and freshwater genera that have been hitherto discovered in Great Britain ; an historical review of the additions made to this department of our Fauna by each successive writer from Merret downwards ; and a list of the British and of the principal foreign works treating on the subject.

An " Artificial Table of the Genera " constructed for the use of the mere conchologist who confines his observations to the shell, is followed by some observations on the principal points to be attended to in the description of shells, founded on their relation to the animal, with reference to which alone they can be properly studied ; and we then arrive at the more strictly Systematic part of the work, the only part in which any portion of Dr. Turton's ' Manual ' has been retained. But even here all that has been derived from the original work consists of the mere characters and descriptions of the shells, with a few occasional observations, all of which have undergone revision ; while the outline of the distribution of *Mollusca*, the characters of the classes, orders, families, and genera ; the descriptions of the animals ; the physiological and other notices accompanying these descriptions, &c. &c., which constitute the chief value of the work, have been added by Mr. Gray.

The number of species described amounts to 128, arranged under 38 genera ; and all of these with one exception (*Vertigo angustior*, which, as the author states, could not be procured) are figured in the plates, supplementary tables containing the more recently discovered species having been added to those previously contained in Dr. Turton's work. The original plates have also, it is stated, been revised, compared with the specimens, and corrected where necessary ; and enlarged details of some of the smaller species have been added. Woodcut illustrations representing the animals of the different families and of most of the genera, together with a few of the shells, have also been introduced in the form of vignettes ; and the work is got up in a handsome and creditable style.

It would be superfluous to recommend such a work and so edited to those for whose use it is intended, and to whom it can only be necessary to indicate its existence and its contents.

PROCEEDINGS OF LEARNED SOCIETIES.

WERNERIAN NATURAL HISTORY SOCIETY.

April 4.—Professor Jameson, President, in the Chair.

Professor Traill made a communication to the Society on the nature of the food of the genus *Trochilus*, or Humming-bird, accompanied with a dissection. The information communicated on this occasion was not to be considered in the light of a new discovery, as the Professor intimated he had made the observations many years ago. It was a favourite notion, he remarked, with Buffon and the older writers on natural history, that the food of these birds was scarcely less æthereal than their forms, and that they partook of nothing more substantial than the nectar of flowers. This opinion was first contradicted by Wilson, who, speaking of the birds in a state of confinement, had remarked, that although they did not refuse to partake of sugar and water, yet they frequently devoured insects. Dr. T. stated that he had opened the stomachs of a great number of these tiny creatures, and did not remember that he ever failed in finding insects, often many, and these of large size when compared to the size of the captor. They were usually winged insects; and the resort of the birds to honeyed flowers was naturally explained by the fact that to these many insects resorted for their favourite food. In the dissected specimen which the Doctor exhibited, the stomach had been opened, and there still remained *in situ* three insects of very considerable dimensions. The stomach was remarkably muscular, as was also the heart; and in fact the whole muscular system was exceedingly developed. This remark applied particularly to the muscles of the wing,—to its principal muscle, the pectoralis externus, which brings the wing down to the body, and scarcely less to the pectoralis minor, which elevates the member. The Doctor stated that he had removed the whole muscular apparatus from the body, and weighed it, and then weighed the rest of the frame, had repeated this observation upon a variety of other birds, and found that in none was the relative development apparently so great.

Dr. Traill added some further observations upon the anatomy of the tongue and the os hyoides. The long and extensile tongue is extensively bifid in a horizontal direction, one of the forked portions lying above and over the other. Both of them are tubular, an observation based upon his personal observation, and in contradiction to the denial of some respectable naturalists, whose error he con-

ceived arose from their observation having been on dry and not fresh specimens. The upper side of the tongue is rugous, and the point, especially of the upper part, almost horny. Hence, he esteemed its functions threefold: 1st, From that portion of the tongue which is nearest, the point being supplied with an adhesive secretion, a portion of its food, as in the Bee-eater, readily adhered to it; 2nd, in a degree prehensile, it somewhat discharges the functions of a hand; and 3rd, with the sharp hard point of the upper filament, it possesses the power of impaling and retaining its victims. With regard to the os hyoides, its cornea are, as in the Woodpecker, much elongated, and curved round behind the head; to this powerful muscles are attached, and hence the rapidity and vigour of the motions of the member.

MICROSCOPICAL SOCIETY.

April 22nd—Mr. Owen, the President, in the chair.

Seven members were elected. Dr. Lindley communicated a short account of his observations on the antheridia of *Polytrichum*, in the cells of which are contained microscopic animalcules of the genus *Vibrio*. This discovery, made by Unger, in reference to the antheridia of *Sphagnum*, and afterwards observed by Meyen, has been confirmed by the observations of Dr. Lindley, who gives the following description.

The antheridia contain a cellular mucous substratum of great transparency, and in each of the cells lies one coiled up *Vibrio*, which turns round and round within the cell with such rapidity, that it resembles a cyst in very active motion, the dark head of the *Vibrio* forming an eccentric point round which the rotatory motion takes place. As soon however as the *Vibrio* gets into the water, its tail becomes straightened, and then the true nature of the moving body becomes apparent. The paper was accompanied by living specimens of the object.

Mr. Bowerbank read a paper descriptive of four new forms of vegetable tissue, occurring in silicified wood from Antigua, &c.

The three first of these are from Dicotyledonous woods, and present some interesting varieties of reticulated vascular tissue. In one example the thread of the net-work is filled with numerous irregular vesicular cavities, not exceeding the $\frac{1}{15000}$ of an inch in diameter; and in a second the interstices appear to contain the remains of discoid organs like those seen in the vessels of Ephedra, to which genus the author thinks the fossil may probably be referred. The fourth form is from a silicified palm, and consists of

numerous minute globules, which when viewed with a power of 800 linear, are seen to constitute a very beautiful fibro-vesicular tissue, having a broad and gibbous thread with irregular interspaces. The original structures, together with highly magnified drawings of the tissues, were exhibited to the Society.

Messrs. John Dalrymple and Varley communicated the result of their observations on the circulation in *Closterium*, and also on the structure of other allied genera.

MISCELLANEOUS.

ON A TORPEDO TAKEN ON THE IRISH COAST.

In the last week of October 1838, a Torpedo, taken on the Irish coast by a fisherman who supplies the Dublin market, was brought to the metropolis, and when quite recent purchased by Dr. Jacob, Professor of Anatomy, &c. to the Royal College of Surgeons. When in Dublin some time afterwards, I embraced the opportunity of examining the specimen, which was at once afforded me with Dr. Jacob's usual kindness and liberality. The fish, from the careful manner in which it had been kept, was with the exception of the electric organs (which had been removed) still perfect, and for every purpose of description in as good a state as could be desired. My chief object was to ascertain its species, as even in our latest works—those of Jenyns and Yarrell—that of the Torpedo of the British seas is considered to be undetermined. Although the investigation was on the whole unsatisfactory, owing to the confusion in which the species of Torpedo are at present involved; the notes made with reference to the works consulted on the subject may possibly be worth transcribing.

Of Gesner's figures, none accord with the individual under consideration, and if they be correctly drawn, it differs in species from them. It does not agree with either of the Torpedos given by Aldrovandus, nor with those of Johnston—his appear to be copies from preceding works. Willughby's figure (*T. maculosa*) is the same as that of Aldrovandus. With one taken on the coast of France, at Rochelle, and figured by Walsh in the Philosophical Transactions for 1773, vol. lxiii. tab. 19. my specimen is evidently identical; the only difference worthy of note is, that the spiracles are represented as notched, which they are not in the specimen, and this cannot be a sexual character, as Walsh's fish was a female as well as the pre-

sent individual*. In the Phil. Trans. for 1774 (p. 464) Mr. Walsh records the occurrence of the Torpedo on the southern coast of England, stating that it had been procured at Torbay, Mount's Bay, and Brixham. This gentleman likewise mentions his having been informed at the village of Ring near Dungarvan, county Waterford (where he was aware that Smith in his History of this county recorded a Torpedo as having been captured about thirty years before his visit), that one or two of these fish are occasionally taken there in the course of a year. But in regard to species, the author in this communication describes a Torpedo received from Brixham, which is certainly the same as the specimen under consideration. He observes, "the back of it was of a dark ash-colour, with somewhat of a purple cast, but not at all mottled† like those of the Atlantic coast of France, nor regularly marked with eyes, as they have been called, like some found in the Mediterranean. Its under part was white, skirted however with the same ash-colour, which towards its tail become almost universal. The side fins being a little contracted and curled up, prevented the precise measurement of its breadth, but it appeared to hold the general proportion observed in those of La Rochelle; that is, the breadth was two-thirds of the length," p. 465. Bloch's figure represents a different fish from the present one. Pennant copies Walsh's plate illustrative of the French specimens‡. Donovan (vol. iii. pl. 53.) does not inform us whence his figure was taken, but that it was not drawn from a recent individual may be inferred from the only original information he gives of the Torpedo as a British species, being—"we can further say upon the best authority, that this species has been more than once taken upon the sandy coasts near Tenby, in Pembrokeshire, South Wales." His figure exhibits five spots, the spiracles notched, and the tail somewhat longer than that of the specimen before me. Risso's *Torp. unimaculata* and *T. marmorata*, fig. 8. and 9. tom. iii. ed. 1826, appear very different from my fish—the former displays spiracles with an even or circular margin; the latter has them notched. Blainville (Faune Française, p. 45.) considers the *Torp. narke*, *T. unimaculata*, and *T. marmorata*, described as distinct species by Risso, to be only varieties of one. Blainville figures the three; the two last are longer tailed than mine.

* John Hunter likewise figures the spiracles notched in the largest engraving of the fish that I have seen, and a female is represented. Tab. 20. It follows Mr. Walsh's in Phil. Trans. 1773.

† Small dark markings appear scattered over both upper and under side in Mr. Walsh's figures.

‡ Pennant describes the spiracles of a Torpedo which came under his observation, as having "six small cutaneous rays on their inner circumference."

T. marmorata approaches it more nearly in form, but is less clumsy: the spiracles are in all three represented as notched. Fleming (Brit. Anim.) not having seen specimens, describes from other authors. In the Phil. Trans. for 1834 (p. 542.), Dr. Davy states, that the *Torp. marmorata*, Risso, and *T. Galvani*, Risso, are identical—in this memoir two Mediterranean species are described, of which this one only approaches the specimen before me. Jenyns (p. 509.) considers the British species of *Torpedo* to be undetermined, as likewise does Yarrell, whose figure (vol. ii. p. 410.) we may therefore presume has not been made from a native specimen.

Of Dr. Jacob's *Torpedo*, which is a female, the entire length is 34, the greatest breadth 23 inches; breadth across the ventrals $9\frac{3}{4}$ inches. The body is rounder and forms a greater portion of the whole than in Yarrell's figure (and still more so than in Willughby's, which the author just mentioned considers the same as his); it is $19\frac{1}{2}$ inches long from the anterior extremity to the part of the body which is on a line with the extremity of the pectorals, and $14\frac{1}{2}$ inches thence to the end of the caudal fin. The first dorsal fin, which is 3 inches in height, extends for 2 inches along the trunk of the tail, and terminates nearly on the same plane with the ventrals: the second dorsal fin originates about $1\frac{1}{4}$ inch behind the first; it is $2\frac{1}{2}$ inches in height, occupies $1\frac{3}{4}$ inch of the tail, and extends within $1\frac{1}{2}$ inch of the origin of the caudal fin—it thus nearly occupies the portion between the ventral and caudal fins: C. fin 5 inches in length, upper lobe the larger. Eyes minute, $\frac{1}{4}$ inch long and about the same broad, 2 inches 10 lines from the anterior edge of the body, 2 in. 4 lines apart; spiracle opening, circular or without tooth-like processes; a fimbriated process about an inch within the margin: several rows of small sharp teeth; vent about the middle of body within the ventral fins. Colour of the entire upper surface uniform reddish-grey, with obscure and small markings of a darker shade; a single dark spot $\frac{3}{4}$ inch in diameter on the body a little to the left of the middle; under side rich chalk-white prettily bordered with reddish gray, which colour forms a band about an inch in breadth round the pectorals, but narrower on the ventrals, and still more so on the tail.

To recapitulate—in all the works noticed in this communication, and perhaps unnecessarily so, the only figures of the *Torpedo* corresponding exactly in proportion with my specimen are Walsh's*,

* I do not recollect to have seen it anywhere satisfactorily stated, whether individuals of the same species differ much in general outline, or whether the sexes ever vary much in this respect—colour is admitted to be no character. See in particular Dr. Davy, Phil. Trans. l. c.

which are copied by Pennant. Those of the *Tremola* illustrative of Dr. Davy's memoir, seem much the same. Two desirable points are however attained—the identity of the species with Walsh's specimens from the coasts of France and England; and the description of an authentic example of the fish. From Dr. Jacob I learn, that two Torpedos were taken at the same time about 10 years ago, and he thinks off Dublin bay, like the present individual; of one of these there is a cast in the Museum of the College of Surgeons in Dublin*; this I have examined; it is 38 inches in length, 28 in breadth, and represents the same species as the subject of the present communication.—WM. THOMPSON, Belfast.

METEOROLOGICAL OBSERVATIONS FOR APRIL, 1840.

Chiswick.—April 1. Slight rain: cloudy. 2. Hazy: very fine. 3. Cold dry haze: frosty at night. 4—6. Very fine. 7. Fine: stormy showers at night. 8. Slight showers. 9. Cloudy and cold. 10—12. Very fine. 13—17. Fine but very dry. 18. Clear, hot and dry. 19. Hazy: very fine. 20. Very fine. 21—23. Cloudy and fine. 24. Very fine. 25. Very hot, nearly cloudless, and excessively dry. 26, 27. Hot and dry. 28. Excessively hot for the period of the season, thermometer 81° in the shade. 29, 30. Very fine: hot and dry. This month is remarkable for the limited quantity of rain and for a high temperature; the latter being the consequence chiefly of a powerful direct solar heat, which overcame likewise the counteracting effects of north and north-east winds, for they were in fact more prevalent than those from the opposite direction.

Boston.—April 1. Cloudy: rain P.M. 2. Rain. 3—5. Fine. 6. Cloudy. 7. Cloudy: stormy with rain P.M. 8. Cloudy: hail and rain P.M. 9—11. Fine. 12. Rain: rain early A.M. 13—19. Fine. 20—24. Cloudy. 25—29. Fine. 30. Cloudy.

Applegarth Manse, Dumfries-shire.—April 1. Mild day with a shower. 2. Keen and cold but dry. 3, 4. Dry and more temperate. 5. Fine day after a very slight shower. 6. Stormy day with showers, though slight. 7. Keen cold day. 8. More moderate. 9. Fine mild day. 10. The same: slightly moist and cloudy. 11. Drizzling all day, but very lightly. 12. Fine though cold: slight rain P.M. 13. Fine soft slight rain. 14. Charming spring day. 15. The same: with frost rime A.M. 16, 17. Fine but coldish: frost rime again. 18. Very fine warm day. 19. The same: white rime A.M. 20. The same: slight showers P.M. 21. The same: gentle shower. 22. The same: moisture. 23. Dry but threatening. 24. The same: cleared up. 25—28. Beautiful day. 29. The same, but cloudy. 30. The same: very warm.

Sun shone out 29 days. Rain, very slight, fell 6 days. Frost, rime 4 days.

Wind north 1 day. North-east $\frac{1}{2}$ day. East-north-east 2 days. East 3 days. East-south-east 1 day. South-east $\frac{1}{2}$ day. South-south-east 2 days. South 7 days. South-south-west 1 day. South-west $7\frac{1}{2}$ days. West-south-west 1 day. West $2\frac{1}{2}$ days. North-west 1 day.

Calm 15 days. Moderate 8 days. Brisk 3 days. Strong breeze 3 days. Boisterous 1 day.

* Mr. R. Ball has made an excellent cast from the present specimen.

ANNALS OF NATURAL HISTORY.

XXXIV.—*Notes on some Viviparous Plants.* By GEORGE DICKIE, Esq., A.L.S., Lecturer on Botany in Marischal College, Aberdeen.

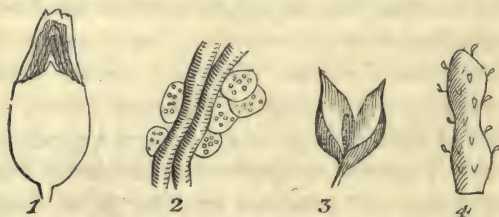
IF by the term viviparous is meant the production by the parent of young and perfect plants instead of the usual method of propagation, then this expression is used rather indiscriminately, and in some instances very improperly. The present remarks being chiefly applicable to British plants, it may be needless to state that comparatively few of them deviate from the usual mode of reproduction; such are chiefly alpine plants, *Polygonum viviparum*, *Saxifraga cernua*, *Festuca vivipara*, *Aira alpina*, and *Poa alpina*, and some others, especially some species of *Allium*, &c.,—and I possess a specimen of *Poa fluitans* which presents an appearance similar to *Poa alpina*, and a like variety of *Cynosurus cristatus* is of frequent occurrence.

In *Poa alpina* the *paleæ* (Lindley) are generally of a soft succulent texture and dark green colour, the outer cuticle being easily detached and possessing numerous stomata; some of the florets have every appearance of being perfect, inclosing stamens and an ovary; in some instances however the stigmata are absent, and in others the ovary is partially transformed into a membranous leaf, and the stamens are sometimes similarly changed and adherent to one another. In *Aira alpina* the same transformations are seen, and the awn of the one palea is most frequently adherent throughout, and sometimes free only at the apex. In these instances, as well as in *Festuca vivipara*, the parts which chiefly deviate from the natural condition are the paleæ; they acquire an increase of development, perform all the functions of leaves, and no doubt

also possess the property of striking root when brought in contact with the soil.

In the other plants already mentioned, *Polygonum viviparum* and *Saxifraga cernua*, a very different structure is present.

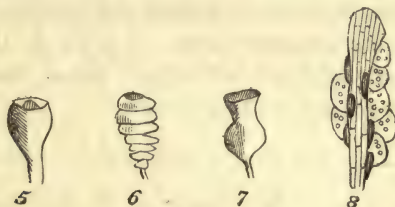
In *Polygonum* the perfect flowers are chiefly confined to the apex of the stem; beneath them are placed numerous oval bodies of a purple colour, excepting near their summit, where they have a different appearance, owing to the presence of a thin loose membrane at that part. Each is supported by a stalk, which is, however, so short as to be almost imperceptible. On making a longitudinal section, it will be seen that each body consists of a strong membrane containing a granular substance. This last is principally cellular; the cells may be easily detached from each other, and each contains numerous grains of starch. Imperfect spiral vessels pass through the centre of the cellular substance. (Fig. 2.) The



purple membrane is itself covered by a cuticle, which is closely adherent to it, excepting near the apex of each body, where it becomes free, at which part also there is an arrangement exactly resembling a bud; numerous scales are found, each inclosing the other; toward the centre they lose their membranous appearance, are more succulent, and in the centre there is a nucleus. (Fig. 1.) The cellular tissue in which the starch occurs, when viewed in a mass, appears of a purple colour, which is owing to the presence of numerous oblong cells that have this tinge; each separate starch cell is colourless, and beautifully transparent. The imperfect spiral vessels already mentioned pass from the point of attachment to the bud at the apex.

The small bulbous bodies occurring instead of flowers on *Saxifraga cernua*, generally consist of two or more thick

fleshy scales, which are concavo-convex, the concavities being towards each other. (Fig. 3.) Frequently there is found inclosed between these a small club-shaped body (fig. 4.) entirely composed of cellular tissue, and bearing on its surface numerous small glandular bodies. Most of these last when highly magnified bear no small resemblance to certain young ovules, each resembling a small cup, in the mouth of which a nucleus is seen; figs. 6. 7, are other forms of these. The fleshy scales are of a pink or purple colour, and consist of a



tough membrane inclosing cellular tissue which abounds with starch. In the midst of this tissue there is a central column (fig. 8.) composed of condensed cellular tissue, and some of the cells are remarkable for their purple colour; no vessels of any kind could be detected.

The general structure is therefore very similar to that of the gemmæ of *Polygonum*; in the bulbs of the Saxifrage there is however no bud at the apex, and true vessels are also absent.

No opportunity has been afforded of observing the manner in which the gemmæ of *Polygonum* grow when detached from the parent, but I have examined specimens of the bulbs of the Saxifrage in the progress of growth while still attached to the plant. Numerous delicate cellular roots are thrown out from the surface, but chiefly toward the narrow extremity; the central column already described is the part which produces the young plant; it increases in size, bursts the membrane, and after some time acquires a green colour.

The *Saxifraga foliolosa* (Brown in Parry) is remarkable for the absence of perfect flowers, instead of which small round fasciculi of leaves are found on the stem. Specimens of this plant were given to me by Mr. W. Maitland, surgeon to one of the whaling vessels; the bulbs were carefully dissected after

maceration in water. Each may be described as resembling a cabbage in miniature, being composed of numerous leaves overlapping each other and becoming more delicate toward the centre. In each specimen examined stamens and pistils were found in the centre; they were, however, of very small size, and such as they are in a very young flower-bud; the anthers appeared to be completely formed, but almost sessile; the pistils were apparently perfect, but so delicate that the slightest injury destroyed their form. It is not improbable that these fasciculi of leaves possess the power of striking root under favourable circumstances. Sir W. J. Hooker, in the Appendix to one of Parry's Voyages, states that the plant is propagated by means of these bodies.

XXXV.—On *Ulex*. By CHARLES C. BABINGTON, M.A.,
F.L.S., F.G.S., &c.*

THE possession of a specimen of *U. provincialis* (Lois.) from Marseilles, and the good fortune of meeting with a flowering plant of *U. strictus* (Mack.) in the Bath Botanical Garden, have induced me to draw up the following short account of the species belonging to this genus, and illustrate it with outline figures of the petals and spines. Although two of the species (*europæus* and *nanus*) are peculiarly common in England, yet I have found that few of the younger of our botanists are acquainted with their true distinctive characters; indeed so much uncertainty exists that a very common variety of *nanus* is almost always considered as a form of *europæus*. The other two species belonging to that section of *Ulex* to which this paper refers, are amongst the least known European plants, one of them (*strictus*) being confined to a few spots in Ireland, and rarely flowering, and the other (*australis*) inhabiting parts of the South of France, Spain, and Morocco (?). The whole genus is confined to the South-western parts of Europe and the North-west point of Africa, having its most northerly limit in Scotland, and its eastern not reaching the centre of Germany.

* Read to the Botanical Society of Edinburgh, May 14, 1840.

I now proceed to describe shortly the four species.

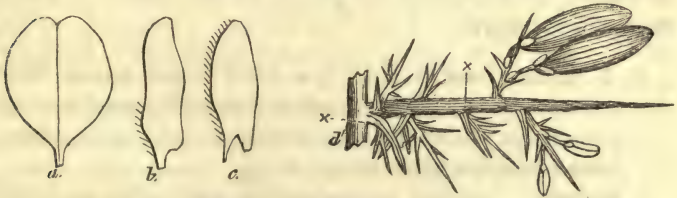
1. *U. Europæus*, (Linn. Sp. Pl. 1045. var. *a.*) Calyce villosa, bracteis ovatis laxis, foliis junioribus subtus villosis sulcatis, spinis primariis validis teretibus polygonis sulcatis minutissime scabris, caulibus hirsutis, floribus lateralibus.

U. Europæus auctorum, Eng. Bot. 742.

In this plant the spines are very large and strong, spreading horizontally, terete, with numerous longitudinal ribs and furrows, minutely scabrous, alternately branched from their very base, and producing the flowers from the branches (secondary spines) or from the primary spines themselves, the points of which do not extend beyond the expanded flowers. The leaves are linear-lanceolate, in the young state downy beneath and furrowed but not ciliated; the bractæas rather large ovate spreading; the calyx shaggy, with the teeth at the summit of each sepal so closely pressed together as to escape notice until carefully examined. The form of the petals will be best seen by the figures.

This plant often grows to the height of from 4 to 6 feet, and flowers from January to June. Common in England.

U. Europæus.



2. *U. strictus*, (Mack. in Trans. Roy. Ir. Acad. xiv. 166.) Calyce villosa, bracteis ovatis laxis, foliis junioribus subtus villosis tenuibus, spinis primariis exiguis tetragonis minutissime scabris, caulibus hirsutis, floribus terminalibus.

U. strictus, Mack. l. c. Lindl. Syn. ed. 2. p. 322.

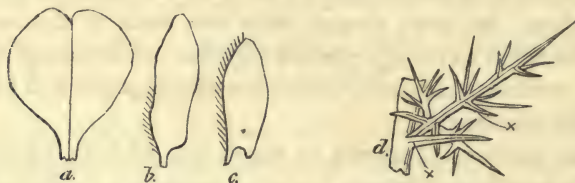
U. Hibernicus, G. Don, Syst. Bot. and Gard. 2. 148.

Here the spines are slender, flexible, and short, ascending at an acute angle from the stem, tetragonal with an intermediate rib upon one of the sides, minutely scabrous, alternately branched from their very base, never (as far as I have observed) producing flowers. The flowers are rarely produced at all; when present they are few in number, springing from

the extreme point of the erect wand-like branches, and rising above the uppermost spines; the bractes are rather large ovate and slightly spreading; the calyx shaggy; the petals very similar in form, but broader in proportion to their length than those of *U. europæus*. The leaves linear-lanceolate, in the young state thin, shaggy beneath, and not furrowed.

Remarkable for its very erect mode of growth and small spines; and although closely allied to *europæus*, it is constantly very different in habit (no intermediate forms having been observed); and possessing as it does characters by which it may be easily distinguished, I cannot but agree with Dr. Lindley in considering that it ought to be ranked as a distinct species.

U. strictus.



Found in the Marquess of Londonderry's park in the county of Down, and a few other places in the north of Ireland, flowering in April.

3. *U. nanus*, (Forst. in Sym. Syn. 160.) Calyce sericeo, bracteis minutis adpressis, foliis junioribus glabris ciliatis sulcatis, spinis primariis gracilibus teretibus striatis lævibus, caulibus hirsutis, foliis lateralibus terminalibusque.

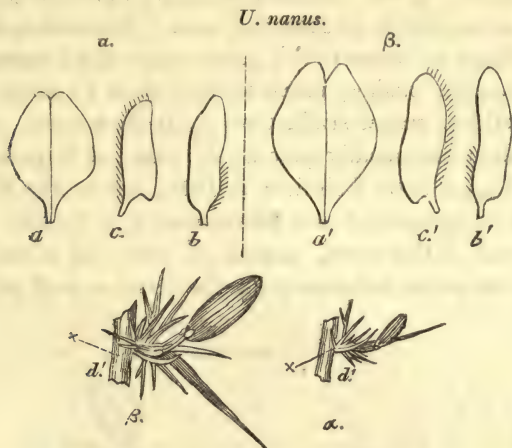
a. typicalis. Caulibus procumbentibus, spinis primariis brevibus gracilibus patulis.

Eng. Bot. t. 743.

β. major. Caulibus erectis adscendentibusve, spinis primariis elongatis validioribus deflexis.

Two marked forms are included under this species, one of them (var. *a.*) with slender short procumbent or slightly ascending stems, forming a beautiful carpet on the heaths which it inhabits, and with small slender spreading spines; the other (var. *β.*) with stems sometimes 5 or 6 feet high forming large bushes, with the spines long, strong, and deflexed. In both the spines are terete, striated and smooth, and producing numerous branches (secondary spines) from their bases alone.

The flowers are produced upon the primary spines only, the points of which extend beyond them; the bracteas are minute and closely adpressed to the calyx, which is finely downy; the form of the petals also is different from that found in the two preceding species, as will be seen by the figures. Leaves linear-lanceolate, in a young state glabrous, ciliated and furrowed.



Equally common with *U. europæus*, var. *a.* is the more frequent in the eastern counties and var. *β.* in the western parts of England. Flowering from Aug. to Dec.*

4. *U. australis*, ("Clemente, *Ensayo de la Vid.* p. 291. (1807)" Webb, *Iter. Hisp.* 48.) Calyce sericeo corollæ subæquali, bracteis minutis, foliis minutis glabris, spinis primariis parvis tetragonis sulcatis lævibus, caulibus glabris.

U. australis, *Clem. l. c.* Webb, *l. c.*

U. provincialis, *Lois. Not.* 105. (1810) *Fl. Gall. (ed. 2.)* 2. 111. t. 27. *DC. Prod.* 2. 144.

Remarkably different from the other species; glabrous throughout, with the exception of the peduncles and calyx, which are finely downy. The spines are small, tetragonal, furrowed, and smooth, alternately branched, but the lowest branch (secondary spine) distant from the stem; the branches again branched (tertiary spines), and bearing the flowers upon the secondary or tertiary spines. The flowers much smaller than in either of the other species, and differing remarkably

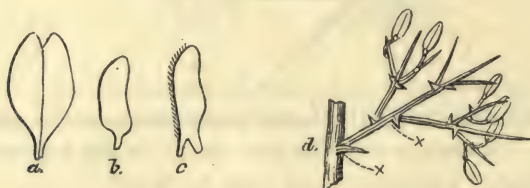
* Not found within thirty miles of Edinburgh.—W. H. C.

from them by having the wings shorter than the keel, whereas in the other three they are longer than it. The bracteas are small and adpressed, resembling those of *U. nanus*. The leaves very minute, glabrous, and not furrowed.

A native of the extreme south-west of Europe, not found in the British Isles, which are probably too cold for it. Flowering in winter. I am indebted to W. C. Trevelyan, Esq. for my specimen, which he gathered near "Marseilles, Nov. 24, 1838," where he states that it grows upon dry limestone hills in low rounded bushes, much smaller than *U. europæus*, but quite as stiff or rather stiffer than it, in the spines.

This plant has usually gone by the name of *U. provincialis*, conferred upon it by Loiseleur in 1810, but as Mr. Webb (in the work above-quoted) has determined it to be the same as *U. australis* of Clemente, named in 1807, all botanists are bound to adopt the latter as being the older as well as the better name.

U. australis.



There yet remain two plants, both natives of Spain, which probably belong to this genus, as observed by Mr. Webb (Iter Hisp. 49.), who has characterized them in the interesting and valuable work referred to, I mean *U. genistoides* of Brotero and *U. Boivini* of Webb. These plants differ in several points from the typical *Ulices* and form the genus *Stauracanthus* of some authors.

St. John's College, Cambridge, May 6, 1840.

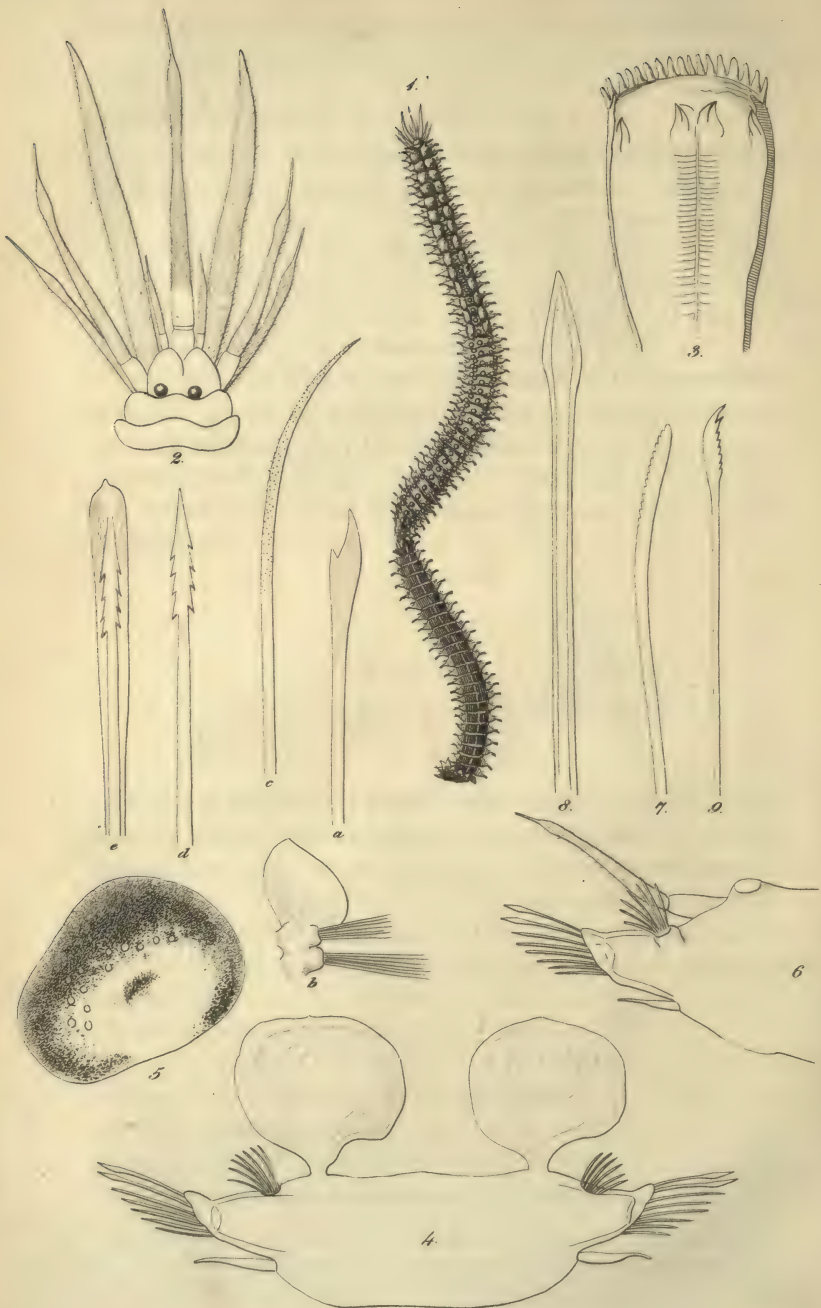
EXPLANATION OF THE FIGURES.

The letters refer to the same parts.

- a.* The standard of the corolla.
- b.* One of the wings of the corolla.
- c.* One of the keel petals.
- d.* A portion of the stem with a spine and its branches and leaves.
- x A leaf.

The size of the flowers is not represented in the figures of the spines, but only their situation. The outlines of the petals are drawn to scale, and point out their difference of size as well as shape.





Polynoe scolopendrina

XXXVI.—*Miscellanea Zoologica*. By GEORGE JOHNSTON, M.D., Fellow of the Royal College of Surgeons of Edinburgh.

[With a Plate.]

[Continued from p. 274.]

THE IRISH ANNELIDES.

I NOW continue my description of the collection of Irish Annelides before me*.

Family APHRODITACEÆ.

1. APHRODITA ACULEATA, *Lin.*—Strangford Lough, Wm. Thompson, Esq.; Bangor, Dr. Drummond.

2. APHRODITA HYSTRIX, *Sav.*—Aud. and Edw. Litt. de la France, ii. p. 70. pl. 1. fig. 1—9. Courtmasherry Harbour, county Cork, Mr. Geo. J. Allman.

I had previously received a specimen from Mr. Edward Forbes, who dredged it in 20 fathoms water about 4 miles from land on the N.W. coast of the Isle of Man.

DESC. *Body* elliptic-oblong, depressed, the back covered with 15 pairs of imbricated naked scales; the sides hirsute and spinous with golden and brown-coloured bristles; the ventral surface of a dirty blackish-brown colour, covered with a coriaceous tuberculated skin, marked with transverse parallel rugæ along the margins, and with a narrow depressed space down the centre. *Head* small, entirely concealed under the front scales; *eyes* very distinct, occipital, pedunculate; between and above the peduncles there is a short porrect biarticulate *antenna*, and on one side of the mouth a long awl-shaped ciliated *palpus* invested with a fleshy sheath at the base. *Proboscis* large and muscular. *Scales* large, irregularly heart-shaped, smooth, soft, thin and membranous, with entire even margins, overlapping each other on the median line and behind; the anterior pair is small, rounder than the others and hidden under those that follow, and the posterior pairs are likewise so much imbricated that the anal ones are almost concealed: they are all attached to a fleshy peduncle and are of a greyish or flesh-colour tinted with brown. *Feet* 32 pairs; the anterior and posterior are minute, but they gradually in-

* See Annals Nat. Hist. vol. v. p. 168.

crease in size towards the middle of the body, where they attain their greatest development. They are of two kinds,—the squamiferous and cirriferous,—but a foot of either is divisible into two branches, viz. a ventral and dorsal. The ventral branch (or proper foot) forms a stout rough tuberculated conoid process armed with a stout *spine* protruded from the pale papillary apex, and with four or five firm *bristles* proceeding from under the apex and partially surrounding the spine. The *spine* tapers insensibly to an obtuse point, is smooth, and of a pale yellow colour: the bristles are of a rich burnished brown colour, with a round shank which grows a little thicker upwards, and is terminated with a curved cutting point like a pruning-knife; in most of them there is also a tooth-like process on the inner side beneath this point. (Plate V. fig. *a*.) The *cirrus* of the foot does not reach its apex, excepting that of the first pairs; it is fleshy, setaceous, and of a pale colour. The dorsal branch of all the feet has an upward direction, and cannot be used as an organ of progression along the ground: that of the *squamous feet* is armed with two bundles of bristles (*b*), each proceeding from a distinct tubercle; the innermost or dorsad brush consists of many slender golden yellow bristles, arranged in a fan-shaped manner; they are comparatively short, curved like the italic letter *f*, and roughened with minute granulations on their upper half (*c*): the bristles of the other brush, placed between the dorsad one and the proper foot, are remarkable for their stoutness and length; they are of a rich dark brown colour, straight, and terminated with a lanceolate point, which is notched on each side with four reverted barbs, so that the bristle resembles the barbed arrow or spear of the South-sea islanders (*d*). The notches are not opposite, but alternate, and they are inclosed within a plain sheath, consisting of two dilated valves which shut upon them (*e*). The *cirriferous foot* has a single fan-shaped brush of bristles only; the bristles are simple and curved like those of the dorsad fascicles of the squamous feet, but they are more numerous, slenderer, longer, of a paler colour, and quite smooth; they are unequal in length, some of them very fine and hair-like, and the whole brush is usually matted and soiled with extraneous matters. Length of the worm 2 inches; breadth $\frac{6}{10}$ ths.

The slight differences which may be detected between the above description, drawn up from an examination of two specimens of this worm, and that of Audouin and M. Edwards, do not indicate any difference of species. The body of our specimens was much more oblong, and in both of them one palpus only was to be found; but the eminent naturalists just mentioned tell us that the worm is variable in form, and, though they delineate two palpi of equal size, they also say that often one of them is much less developed than the other. The scales are represented by M. Edwards as roundish, inclining to oval: we found those near the middle of the back somewhat heart-shaped, but not uniformly alike, and those near the extremities were rounded. When highly magnified they appeared to be striated with fine lines, and were thinly sprinkled over with very minute granules.

3. *POLYNOE SQUAMATA*, Sav.—Bangor, Dr. Drummond; Strangford Lough, Messrs. Hyndman and Thompson; coast of county Down, Mr. Thompson; Belfast Bay, E. Getty, Esq.—From the number of specimens it may be concluded that this is a common species.

4. *POLYNOE CIRRATA*, Sav.—Belfast Bay, Messrs. Thompson and Getty; Strangford Lough, Messrs. Hyndman and Thompson; Bangor, Dr. Drummond; Sligo, Mr. Hyndman. The specimens are still more numerous than those of the preceding, and scarcely two are alike in the colour and variegation of the scales.

5. *POLYNOE SCOLOPENDRINA*, Sav.—Aud. and Edw. Litt. de la France, ii. p. 92.—Bangor, Dr. Drummond; coast of county Down, Mr. Thompson. Plate V.

DESC. *Body* linear-elongate, flattened, rounded in front and slightly tapered behind, attaining a length of nearly 4 inches, and about 4 lines in breadth; the anterior portion of the back scaly, the posterior and larger portion naked but muricated with small tubercles arranged in three rows, one down the middle, and one on each side above the bases of the feet: ventral surface smooth, grooved down the middle,

more or less iridescent. *Head* concealed by the front scales, small, tumid, somewhat heart-shaped, sinuated in front, smooth and flesh-coloured; *eyes* 2, very distinct, round and black, placed far back on the occiput and remote from each other: *antennæ* 3, the mid one originating in the sinus of the head, large and equal in length to the palpi, setaceous with an abruptly acuminate point, downy, of a dusky colour, but pale and jointed at the base; the lateral antennæ are only about a third the size of the odd one, and of the same form and structure. *Palpi* 2, awl-shaped, larger than the odd antenna, downy or ciliate, and of a straw-yellow colour. On each side of them there is a pair of *tentacular cirri* equal in length to themselves, but not so stout, and in every respect resembling the mid antenna. *Mouth* inferior, terminal, furnished with a protrusile *proboscis*, armed with 4 jaws of a horn colour, and encircled at the orifice with a series of short conical papillæ. *Segments* numerous, narrow, deeply incised on the sides, broader than deep. *Scales* deciduous, rather small, roundish, smooth, with a plain unfringed edge, of a greenish-grey colour, irregularly clouded, and covered with pale puncture-like dots. In all our specimens some pairs had been lost. Audouin and M. Edwards say there are 15 pairs, and they are affixed to every alternate segment after the fashion of the more normal species of the genus. The anterior pairs are imbricated and cover the back entirely, but the posterior pairs lie over the bases of the feet, and leave the back naked in the middle. *Feet* well developed, homologous; the dorsal branch represented by a mere tubercle, from which grows a fan-shaped brush of short stout equal bristles; the ventral branch conoid, protruded much beyond the dorsal, obliquely truncate, armed with a series of golden-yellow strong bristles, and with a small inferior *cirrus* which does not extend beyond the apex. *Bristles* of the dorsal branch somewhat curved, rather obtuse, rough on one side, and generally soiled with extraneous matter; those of the ventral branch more than twice as long, decreasing both in strength and length as the series descends to the belly, the two upper ones pointed like a lance, the rest like a hedge-knife, with

two sharp denticles at the tip, and the inner edge of the curved part minutely serrulated. *Spines* yellow, tapered insensibly to a rather obtuse point, one to each brush of bristles. *Tentacular cirri* awl-shaped, abruptly acuminate, downy or ciliate, of a dusky or dark colour, with paler spots, reaching to or a little beyond the apex of the foot; all the feet posterior to the 31st pair are furnished with these cirri, but only those anterior to them which are destitute of scales. Tail without elongated styles.

It is difficult to describe the colouring of this fine worm. Of specimens preserved in spirits the ground colour is a straw or ochre-yellow, but the back is clouded and spotted with dusky olive-green, there being a row of spots down the middle, a line or band along each side, and another row of spots exterior to this above the bases of the feet; and these markings correspond with the arrangement of the tubercles which roughen this surface. The number of segments is liable to vary. Audouin and Edwards say that there are 82 of them. In one specimen we found them to be about 80; but that which served for our figure, and which was twice the length of the other, had not less than 110.

PLATE V. Fig. 1. *P. scolopendrina* of the natural size. 2. The head with its appendages, highly magnified; the front scales have been removed. 3. The proboscis laid open. 4. Section of a segment, showing the squamous feet; the scales have been raised and reverted. 5. A scale. 6. One of the cirrigerous feet. 7. A bristle of the dorsal brush. 8. The upper bristle of the ventral brush. 9. One of its under bristles.

6. SIGALION BOA, *Johns*.—Strangford Lough, Messrs. Hyndman and Thompson.

[To be continued.]

XXXVII.—On the *Corymorpha nutans* of *Sars*, a remarkable Hydroid Polype. By EDWARD FORBES, Esq., and JOHN GOODSIR, Esq.

AT the Birmingham Meeting of the British Association we gave a short account of a remarkable Hydroid Zoophyte, new to the British seas, which, supposing it to be altogether new, generically and specifically, we proposed to name *Ellisia flos*

maris. This name was objected to by our distinguished friend Mr. Gray, as having been already employed to designate a genus of plants.

In a rare volume, written in the Norwegian language, entitled ‘Beskivelser ag Jagttagelser af Polypernes, &c., &c.,’ by M. Sars of Bergen, in Mr. Gray’s possession, we recognised a figure and description of our animal, which had been previously discovered by M. Sars, in the year 1835, and named by him *Corymorpha nutans*. The work of the Norwegian naturalist contains many most important observations on the marine animals of the west coast of Norway; and, from the intimate relations between the Fauna of that country and that of North Britain, deserves every attention from British naturalists. From having examined many of the animals described by M. Sars, we can bear witness to the accuracy and fulness of his descriptions. M. de Blainville had quoted the volume in question in the Appendix to his useful ‘Manuel d’Actinologie,’ and alluded to the genus *Corymorpha*, but has so mistaken the author’s meaning that it was impossible to recognise the animal by the short description there given. Of course we withdraw altogether our proposed name of *Ellisia*, and adopt the original appellation of M. Sars.

As the animal is of great interest to the zoophytologist, being the largest Hydroid polype known, and throwing great light on the structure of its allies in the order Hydroidea, and as we have had the most favourable opportunities of examining the creature in detail, having dredged more than twenty specimens and watched them alive,—while the discoverer of the species found but two, and those apparently from his notice thrown ashore in a debilitated state,—we have drawn up the following detailed account from the British examples, adding whatever appeared of additional interest from that of M. Sars.

The *Corymorpha nutans* is about four and a half inches in length, and its stem at the thickest part half an inch in diameter. In form it resembles a *Tubularia* rather than a *Coryne*; but not being placed in a strong horny tube like the former, presents much of the habit of the latter. When

young the greater part of the body is inclosed in a thin brown membranous tube, which appears to have no organic connection with the animal, and which growing thinner as the animal gets older, at last disappears altogether. The body or stem is rounded, solid, and flexible, and is somewhat thicker towards the base than above, where it tapers rather suddenly to the neck. The base is fusiform and tapering to a point, and roots in the sand, fixing itself there by means of branching filamentous roots. When sand is much gathered round these roots, they present that subglobose appearance seen in M. Sars's figure. The whole of the stem is translucent, of a white colour tinged with pink, and lineated with pinkish-brown, longitudinal lines arranged in pairs. When magnified these lines are seen to be composed of ob-long dots. M. Sars described these stripes as being of a pale vermilion colour in his specimens. These lines do not run down the fusiform root, neither do they extend upwards quite to the neck, round which there is a band of pink. Above the neck is the head, which is ovate or pyriform, and terminates in a long pyramidal pink trunk, at the extremity of which is the mouth. Round the thickest part of the head is placed a row of between 40 and 50 tentacula, which are very long, white, and not contractile. They are not ciliated. Immediately above this circle of tentacula are the ovaries, which are 14 branched orange-coloured processes of considerable size, about one-third as long as the tentacula, each of their branches terminating in a sort of head. Above these the trunk is covered with very numerous white tentacula, directed upwards, not contractile, and very much shorter than those of the lower circle.

The internal structure is as follows. The stem is entirely solid, the substance filling it being jelly-like in appearance, as if contained in cells of a slightly fibrous tissue. When a transverse section of the stem is made in the living animal, the outer membrane contracts so as to diminish the dimensions of the amputated portion. No vascular structure could be detected, on the most minute examination of transverse and longitudinal sections of the stem; nor could any current be observed, either with the naked eye or the microscope, in

this part of the living animal. The tentacula are all solid, and composed of the same substance as the stem and head. Within the head is the stomach, opening externally by a small circular mouth without any fringe or oral apparatus. This stomach is flask-shaped, having an elevated floor like the bottom of a bottle. It does not descend below the level of the lowermost range of tentacula. Its internal surface is villous, but not ciliated, neither are there any cilia on any part of the body.

This description of the internal structure differs from that of M. Sars, who says, "If the skin of the Polype, which is pretty strong, be cut up, the interior is found quite empty, without any intestines, except a small cylindrical gut or stomach, which at the upper end is a little wider than at the lower, and runs straight from the mouth downwards without bending to the lower half of the body, or a little lower, where it terminates abruptly, a large number of threads joined by network diverging like rays from its end towards the skin, where they fasten themselves. On this stomach are also to be seen strong longitudinal stripes." This appearance is presented only by the animal after having been kept for some time in alcohol; but we can assert positively that no such structure exists in the living animal. Misled by the above fallacious appearance, M. Sars has drawn a false analogy between it and the *Actinææ*.

To what we have said of the deciduous tube, one of the most extraordinary points in the œconomy of this zoophyte, we must add that the filaments branching from the roots are, properly speaking, processes of its tube; for the young animal may be drawn out of its tube uninjured, and then the tube and the roots will be seen entire. In the adult animal the filaments and that part of its tube which envelopes the root still remain, while the upper part disappears. As ovaries of the specimen described by M. Sars were much further advanced than those in our examples, we quote the following observations from his account of them:—

"They are for the most part two-branched; at the end of the branches, the eggs, improperly so called, were seen resting, heaped together in large quantities. These eggs or buds

have an exceedingly remarkable form and internal construction. For if they are examined with the microscope, it will be found that they have an oblong-round conformation, broadest at the top, and slightly blunted; smallest at the bottom and fastened by a very short stem to the branch. If considered still more attentively, it will be seen that these eggs (the internal structure is easily observed in consequence of their transparency,) seem already to contain within them the most important parts of the future polype. For instance, we observe in the middle a part which in form, &c. corresponds to the knob in the full-grown animal. This part in the various eggs is of various forms; in the smaller ones, round or oblong; in the large and best developed, perfectly bottle-shaped. Further, there are observed in the upper or broad end of the egg four roundish projecting knots, which internally are continued as tubes downwards to the base of the bottle-shaped part. One of these knots is always larger and longer than the other three, which are alike, and it terminates after a small indentation with another small projecting knot. It therefore occurs to me as not improbable, that the largest knot, with its interior continuation, develops itself as the stem, while the interior bottle-shaped part forms the head of the polype. However much these eggs at the first glance resemble the egg capsules or fruit depositors in one kind of *Sertularia*, I was confirmed in the opinion just expressed, partly because I could not observe any eggs within them, but chiefly on account of another observation which appears to me important. In some of the larger eggs, where the above-mentioned internal parts were particularly plain, I observed very evident, indeed powerful movements; inasmuch as the egg, which seemed already to have reached its full maturity, alternately contracted and expanded itself quickly, and so by this systole and diastole endeavoured to disengage itself from the mother animal. I had no opportunity of observing the disengagement or the further development of it."

The language of the above observation is fanciful; but there can be no question of the accuracy of the statements.

We found the *Corymorpha* in 10-fathom water, in a sandy
Ann. Nat. Hist. Vol. 5. No. 32. July 1840. z

bottom in the Bay of Stromness, Orkney. When placed in a vessel of sea-water, it presented the appearance of a beautiful flower. Its head gracefully nodded (whence the appropriate specific appellation given it by Sars,) bending the upper part of its stem. It waved its long tentacula to and fro at pleasure, but seemed to have no power of contracting them. It could not be regarded as by any means an apathetic animal, and its beauty excited the admiration of all who saw it.

The following is the generic character given by Sars.

Gen. CORYMORPHA, *nov.* Corpus longum, cylindricum, molle, superne clavato-vesiculosum, inferne conico-attenuatum, tubulo cutaceo hyalino tenuissimo partem corporis inferiorem circumdante, libere (non affixum) insidens. Clava conica, basi serie tentaculorum longorum circumdata, et ostentaculis brevibus sparsis.

1. Spec. CORYMORPHA *nutans*. Corpore hyalino, lineis longitudinalibus pallide rubris.

The affinities of this genus may be stated thus: The family of *Tubulariadae* is a group of Hydroid polypes connecting the true *Hydrae* with the *Sertulariadae*. This connexion is twofold,—1st, between truly naked polypes and such as form a horny case; and 2nd, between polypes mostly simple or individual in their nature, and polypes truly compound. It is not too much then to expect, that the characters essentially generic in this family, should depend on this double progression from one alliance to another, as well as on some characteristic point in the organization of the animals comprising the group, considered as members of one family; in other words, on one positive and two comparative subjects of character.

The comparative characters we find,—1st, in the presence, absence, or nature of a tube, indicating a progression from the *Hydrae*; and 2nd, in the form of the tube when present, whether simple or branched, indicating an approach to the *Sertulariadae*.

The positive character we see in the arrangement of the tentacula surrounding the head, which arrangement is truly generic among the *Tubulariadae*, and not merely a family character as in the preceding and succeeding families. Con-

sistent with this view, we find accordingly that *Coryne* is distinguished by having scattered tentacula of one kind only, and by not possessing a tube; *Hermione*, by having scattered tentacula of one kind only, and a branched tube; *Eudendrium*, by having regular tentacula of one kind only, and a branched tube; *Tubularia*, by having two sets of regular tentacula, and a simple tube which is persistent; and *Corymorpha*, by having regular tentacula of two kinds, and a deciduous tube; the animal ultimately becoming naked.

Thus *Corymorpha* completes a circle linking *Tubularia* with *Coryne*, partaking of the characters of both. Yet as it partakes more of the nature of the former than of the latter, it is possible a genus as yet undiscovered may exist, characterized by presenting a permanently noticed body, and regular tentacula of one sort.

British specimens of the *Corymorpha* will be figured by Dr. Johnston in his Supplement to the 'History of British Zoophytes.'

XXXVIII.—*Monograph of the Dorylidæ, a Family of the Hy-menoptera Heterogyna*. By W. E. SHUCKARD, Esq.

[Concluded from p. 271.]

Sp. 2. *Dorylus helvolus*, Lin.

Length $12\frac{1}{2}$ lines.

Expansion $21\frac{1}{2}$ lines.

Helvolus pilosus; capite rufo, facie opalinâ convexâ, petiolo acetabuliformi segmento secundo multo minor.

Vespa helvola, Lin. Mus. Lud. Ulric. Reg. 412. 5.

Mutilla helvola, Lin. Syst. Nat. ed. 12^a. t. i. p. 2. 967. 8.

————, Fab. Mant. i. 313. 18.

————, 'Der Kaper.' Christ. Naturgeschichte der Bienen, &c. p. 151.

Dorylus helvolus, Fab. Ent. Syst. 2. 365. 1. Piez. 427. 1.

———— Coquebert, Dec. 2. pl. 16. fig. 1.

————, Latreille, Hist. 13. 260. Genera Crust. et Insect. 4. 124. Dict. d'Hist. Nat. 2^{me} Ed. 9. 555.

Reddish testaceous, very pilose, especially at the vertex, the thorax, the coxæ beneath, and the apex of the abdomen: the head (excepting the antennæ and the mandibles, which are bright castaneous,) red, sometimes obscure, with most frequently a strong opaline reflection; face about the anterior ocellus very prominent, depressed at the insertion of the antennæ, as also just behind and between their base, where it takes a triangular form: antennæ short, setaceous, the scape rather

more than one-fourth the length of the organ: ocelli disposed in a triangle, with a space of more than the diameter of one between the anterior one and the posterior pair: eyes very prominent; mandibles elongate, acuminate, slightly curved at the apex.

Thorax gibbous in front and at the scutellum: metathorax emarginated, the lateral portion slightly produced: superior wings clouded with a fuscous tinge, their nervures dark brown, the cubital nervure quite straight to the separation of the submarginal cells, and the recurrent inserted at rather less than half the length of the first submarginal; the two anterior femora somewhat lanceolate, the four posterior forming an elongate triangle.

Abdomen cylindrical, the peduncle cup-shaped, very pilose, truncated posteriorly, less than the following segment and viewed laterally, slightly angularly produced beneath; the terminal segment reflected at its extreme apex, and the horizontal plate of the male sexual organ with its sides parallel and its spines elongate and parallel.

Common in collections.

This species is from the Cape, exclusively I believe; for although Latreille says in the first edition of the 'Dictionnaire d'Hist. Naturelle,' that it is also found in India, he could not have compared the specimens, as the latter must be one of the species I describe below from that part of the world. In his 'Hist. Naturelle,' tom. xiii. he says, that this species ranges from Barbary to the Cape: this also is evidently a mistake, and must refer to some other species that I have below described, which are all very distinct, except perhaps the next only, from the present. My reasons for supposing it to inhabit the vicinity of the Cape exclusively are, because Linné, Fabricius, and Illiger describe theirs from that part, and all these descriptions were made from different collections; and in every metropolitan collection that I have examined, in all of which this insect is found, it being the most abundant species of all, it is invariably ticketed from the 'Cape,' and never from any other part, and I have seen some hundreds of specimens of it. It is doubtlessly to this species that Mr. Burchell refers in his Travels*, Oct. 15, 1811. 'On the same evening I caught for the first time a large *Dorylus*, an insect which I afterwards found in the months of November and December within the Cape Colony.' The following insect much resembles the present, but their differences will be pointed out in the observations under it.

Sp. 3. *Dor. affinis*, Shuck.

Length $10\frac{1}{2}$ lines.

Expansion 19 lines.

Helvolus, pilosus; capite rufo-castaneo, facie planâ, petiolo acetabuliformi, segmento secundo multo minor.

Reddish testaceous, very pilose; the head reddish castaneous, excepting

* Vol. i. p. 376. note.

behind the vertex towards the occiput, where it is very dark chestnut ; face covered with decumbent down and in front of the anterior ocelli slightly prominent, flattening as it descends between the base of the antennæ, (where there is a triangular smooth shining space,) which are setaceous and inserted in a rather deep cavity, with their scape rather less than one-fourth the length of the entire organ ; ocelli disposed in a triangle, with a space of less than the diameter of one between the anterior one and the posterior pair ; eyes very prominent ; mandibles elongate, acuminate, slightly curved at the apex.

Thorax gibbous in front and at the scutellum ; metathorax longer than in the preceding species and less distinctly emarginated ; superior wings subhyaline, clouded only within the marginal cell ; the nervures dark brown ; the cubital nervure very slightly undulated as far as the separation of the two submarginal cells, and the recurrent nervure inserted at fully one half of the length of the first of the latter and curving slightly outwards ; legs as in the preceding.

Abdomen as in the preceding, the peduncle rather less transverse, and its produced ventral portion rather boat-shaped, and the horizontal plate of the male sexual organ constricted near the furcation of the spines, which are divergent.

In my own collection.

This species is from the vicinity of the river Gambia ; it is very like the preceding, and a superficial examination might consider it merely a smaller variety of that insect ; but a more careful inspection discovers a number of particulars which establish its individuality—which a comparison of the descriptions will show ; the strongest of them are the different proportions of the cells of the wings and the structure of the plate of the male organ.

Sp. 4. *Dor. glabratus*, Shuck.

Length $14\frac{1}{2}$ lines.

Expansion $23\frac{1}{2}$ lines.

Rufo-brunneus, glaber, subrobustus, nervis alarum nigris, vertice valde prominente facie in medio sulcatâ, mandibulis attenuatis, labro tuberculis binis obtusis instructis et pedunculo abdominis transverso-quadrato.

Rather robust, of a reddish fuscous-brown, glabrous with the exception of some loose curling long hair upon the face, coxæ, and extreme apex of the abdomen. The head reddish chestnut, except behind the vertex, where it is black and shining. The face (which is covered with long curling hair) and vertex very gibbous, and this gibbous portion viewed laterally much larger than the eye ; the face deeply longitudinally sulcated : ocelli placed in a triangle, the posterior pair upon the posterior declivity of the head, and with rather more than the diameter of one between the latter and the anterior one ; eyes moderately large, very prominent ; antennæ short, setaceous, the scape rather less than one-third the length of the organ ; mandibles slightly curved, broad at

the base, whence they suddenly narrow to the apex, the anterior lateral return rather broad; the labrum having two obtuse tubercles.

Thorax gibbous in front and at the scutellum, which is transverse and rounded; the mesothorax in front having a short depression on each side of the two central abbreviated impressed longitudinal lines parallel with the suture, metathorax produced longitudinally, horizontal, where it is abruptly truncated and fringed; wings darkly clouded, with their nervures black and rather thick, the marginal nervure extending to nearly opposite the inner angle of the marginal cell, the cubital nervure slightly sinuated to the insertion of the recurrent (which is inserted at about half the length of the first submarginal), beyond which to the termination of this cell it is straight: legs dark chestnut; femora elongate triangular, their whole outline beneath curving outwards.

Abdomen cylindrical, the peduncle transverse quadrate, convex, not so broad as the base of the following, slightly fringed along its apex, where it has an indicated ridge; the ventral portion with its boat-shaped carina very sharp, second segment also transverse, rather longer and broader than the peduncle; the terminal segment slightly reflected at its extreme apex, where it is densely pilose.

In my own and the British Museum collections.

This species is from the Gambia. Next to the *D. nigricans* it is the most robust of the genus. It is sufficiently distinct from all, but it has the tuberculated labrum in common with the two following.

Sp. 5. Dor. Juvenculus, *Shuck.*

Length $15\frac{1}{2}$ lines.

Expansion 24 lines.

Rufo-fuscus, glaber, subattenuatus; capite (antennis mandibulisque castaneis exceptis) et nervis alarum nigris, vertice valde prominente, facie in medio sulcatâ, labro tuberculis binis instructis et pedunculo abdominis quadrato-convexo.

Rufo-fuscous, smooth, with long curling hair only on the face, between the coxæ and peduncle and at the apex of the abdomen; the head black, except the antennæ and mandibles which are castaneous; face and forehead very prominent, this prominence viewed laterally (in profile) as large as the eye; ocelli placed in an equilateral triangle on the vertex, the posterior pair on the posterior declivity of the head closely behind the summit, and these distant more than the diameter of one from the anterior, in front of which the face is deeply sulcated: eyes very prominent and subglobose; antennæ setaceous, the scape a little less than one-third the length of the organ; mandibles long and slender, slightly curved, rather broad at the base, whence they immediately attenuate, their return in front broadest in the middle, narrowed at each extremity; clypeus furnished between the base of the antennæ with a long flock of curling hair, and the labrum with two small round compressed tubercles.

Thorax gibbous in front and at the scutellum, the latter transverse with a longitudinal impression at its apex ; metathorax elongate*, abruptly truncated at its apex, where it is fringed ; mesothorax slightly corrugated in front on each side of the two abbreviated parallel longitudinal central lines, the wrinkles parallel with the suture that separates it from the prothorax : wings somewhat obscure, with their nervures blackish or dark brown, the radial nervure terminating half way between the commencement and the inner angle of the marginal cell, and where it loses itself in the coloured portion of that cell ; the cubital nervure slightly undulated as far as the insertion of the recurrent nervure, beyond which to the termination of the cell it is straight ; the recurrent nervure also straight, and inserted at rather less than one half the length of the first submarginal cell ; legs castaneous, femora elongate triangular, acuminated towards the apex, the outline beneath slightly rounded downwards, the trochanters of the four posterior strictly adhering and not projecting beyond the lower outline of the femora.

Abdomen elongate, cylindrical, the peduncle quadrate convex, (its central portion viewed laterally triangular,) fringed at the apex, where it has a slight transverse ridge, nearly as broad as the following segment, which and the third are also quadrate, the terminal segment very pilose.

In the collections of the Zoological Society.

This insect is from Barbary, where it was captured by Capt. Lyon. It closely resembles the following, from which, however, the size of the head, proportions of the peduncle, and two first segments of the abdomen chiefly distinguish it. Besides which, the femora in the present form a less acute triangle, and the radial nervure is much shorter and less distinctly terminated. It is remarkable that Barbary and India should produce species so closely resembling each other, when the vicinity of the Gambia, within a very limited district, furnishes others greatly differing among themselves.

Sp. 6. Dor. labiatus, Shuck.

Length $14\frac{1}{4}$ lines.

Expansion 23 lines.

Pallide brunneus seu rufo-testaceus glaber, facie pilosâ subtuberculatâ prominula, in medio profunde sulcatâ, mandibulis attenuatis, labro tuberculis binis magnis instructis et pedunculo abdominis quadrato vel potius subgloboso.

Pale brown, inclining to fuscous, with long curling hair upon the face, beneath the coxæ, and at the apex of the abdomen : head black, except the antennæ and mandibles, which are castaneous ; face slightly tuberculated a little to the side and in front of the posterior ocelli ; forehead not unusually prominent ; ocelli large and disposed in an obtuse

* In speaking of the metathorax as elongate, it is meant comparatively.

triangle on the vertex, the posterior placed on the posterior declivity of the head, closely behind the summit, and these distant not more than the diameter of one from the anterior, in front of which the face is deeply sulcated; eyes very prominent and subglobose, the scape less than one-third the length of the organ; mandibles long and slender, slightly curved, broadest at the base, whence they immediately attenuate, their return in front equal throughout; the clypeus furnished between the base of the antennæ with a long flock of curling hair, and the labrum with a pair of large round compressed tubercles.

Thorax gibbous in front and at the scutellum, the latter transverse and rounded; metathorax elongate, abruptly truncated at its apex, where it is fringed; mesothorax slightly corrugated in front on each side of the two abbreviated parallel longitudinal central lines, the wrinkles parallel with the suture that separates it from the prothorax: wings subhyaline, their nervures dark brown, the radial nervure distinctly extending opposite and rather beyond the inner angle of the marginal cell, where it terminates abruptly, the cubital nervure slightly undulated as far as the insertion of the recurrent nervure, beyond which to the termination of the cell it is straight and inserted at half the length of the first submarginal cell; legs castaneous, femora elongate triangular, acuminate towards the apex, the outline beneath not perceptibly rounded downwards; the trochanters of the four posterior not strictly adhering, and projecting a little beyond the lower outline of the femora.

Abdomen elongate, cylindrical, rather slender, the peduncle subquadrate or rather subglobose (its ventral portion viewed laterally angulated but hooked backwards), slightly fringed below its apex, not so broad as the following segment, which with the next is transverse, the terminal segment very pilose.

In the collections of the Rev. F. W. Hope and Lieut.-Col. Sykes.

This species was brought from Poonah, in the Bombay Presidency, by Col. Sykes, and from Assam by Dr. Cantor, a wider range than I know any other species to take. It considerably resembles the preceding. A comparison of the descriptions which I have purposely made parallel will however show ample differences, although the majority consist of minute particulars, the chief of which have been already pointed out in the observations on the former.

Sp. 7. *Dor. Orientalis*, West.

Length $12\frac{1}{4}$ lines.

Expansion 19 lines.

Helvolus pilosus abdomine glabro, capite rufo, facie in medio sulcatâ, mandibulis subtrigonis, nervo cubitali valde sinuoso, pleuris sericeis, et pedunculo abdominis quadrato gibboso.

Dor. Orientalis, Westwood, Proceed. Zool. Soc. 1835, p. 72.

Pale testaceous with a long shining silky pubescence, especially in front of

the head and throughout the thorax: head red, mandibles and scape of the antennæ castaneous, the latter about one-fifth the length of the entire organ, which is filiform and elongate; ocelli disposed in a triangle at the vertex, large, with less space than the diameter of one between the posterior and anterior, in front of which the face (which is very convex) is deeply sulcated: mandibles very broad and very slightly curved, their inner edge acute and nearly straight.

Thorax silky, the pleuræ shining, gibbous in front and at the scutellum, which is slightly longitudinally impressed in the centre; metathorax rather elongate, slightly rounded at the apex, very pubescent: wings clouded with a fuscous tinge, their nervures dark brown, the cubital deeply bisinuate, the first sinus dipping into the second discoidal cell, and the second beyond the recurrent nervure, which is straight and inserted at rather more than two-thirds of the length of the first submarginal cell: legs castaneous, the femora elongate-ovate, their outline rounded both above and below.

Abdomen with a rich satiny reflection, the peduncle quadrate, gibbous, the ventral portion slightly produced and boat-shaped, the remaining segments transverse, the sexual organ protruding at the apex of the terminal segment and fringed.

In the collection of Mr. Westwood.

This species is from Bengal, whence it was brought by W. W. Sanders, Esq. The differences between it and the next are but slight, and *perhaps* not specific. I make the descriptions parallel that they may be compared.

Sp. 8. *Dor. longicornis*, Shuck.

Length $11\frac{1}{2}$ lines.

Expansion 18 lines.

Helvolus subpubescens; capite nigro convexo facie in medio sulcatâ, mandibulis subtrigonis, pleuris obscuris nervo cubitali subrectis, petiolo abdominis quadrato gibboso.

Reddish testaceous with longish hair about the face and thorax, and especially beneath the peduncle and apex of the abdomen; head black, except the mandibles, which, as well as the scape of the antennæ, are pitchy, the latter not more than one-fifth the length of the entire organ, which is filiform and elongate; ocelli disposed in a triangle at the vertex, large, with less space than the diameter of one between the posterior and anterior, in front of which the face (which is very convex) is deeply sulcated; mandibles very broad and very slightly curved, their inner edge acute and nearly straight.

Thorax obscure, gibbous in front and at the scutellum, the latter with a slight impression in the centre of the apex; metathorax slightly produced and rounded posteriorly, somewhat silky: wings fuscous, their nervures reddish brown, the cubital straight, the recurrent slightly curved outward and inserted at less than two-thirds of the length of

the first submarginal cell : legs castaneous, the femora elongate-ovate, their outline rounded both above and below.

Abdomen obscure, the peduncle quadrate, gibbous, the ventral portion slightly produced and boat-shaped, the remaining segments transverse ; the sexual organ protruding at the apex of the terminal segment and fringed.

In the collection of the Rev. F. W. Hope.

This species is likewise from Bengal ; I am in doubt as to its individuality, or whether this or the former may be the species or the variety, having seen only two of this and one of the preceding ; but a comparison of the descriptions, which are very faithful, will justify my considering them species ; there is however much less difference between them than between the *D. Juvenculus* and *D. labiatus*.

Sp. 9. *Dor. attenuatus*, *Shuck.*

Length 10½ lines.

Expansion 15 lines.

Helvolus, vel testaceus, subpubescens, capite nigro vel rufo, facie in medio sulcatâ, mandibulis subtrigonis, nervis alarum brunneis vel testaceis, pedunculo quadrato gibboso.

Pale reddish, testaceous, opaque, subpubescent, slender : head black, except the mandibles, which, as well as the scape of the antennæ, are pitchy, the latter barely one-fifth the length of the organ, which is filiform and elongate ; ocelli disposed in a triangle at the vertex, moderately large, with about the space of the diameter of one between the posterior and anterior, in front of which the face (which is convex) is sulcated ; mandibles broad and very slightly curved, their inner edge acute with an obtuse angulation at the base within.

Thorax gibbous in front and at the scutellum, the latter transverse with a longitudinal impression in the centre ; metathorax produced slightly and rounded posteriorly ; wings obscure, their nervures reddish brown, the cubital slightly waved, the recurrent straight and inserted at less than two-thirds of the length of the first submarginal cell ; legs castaneous, the femora elongate-ovate, their outline rounded both above and below.

Abdomen obscure, the peduncle quadrate, gibbous, the ventral portion very slightly, obtusely portioned, the remaining segments transverse, the sexual organ protruding at the apex of the terminal segment, and fringed.

In my own collection.

Var. α . Pale testaceous ; head red.

I am not sure of the locality of this species, but I believe it is from the Gambia. In many points of description it agrees with the two preceding, from which however, besides size, an ocular inspection shows them to be apparently different.

Sp. 10. *Dor. atriceps*, Shuck.

Length $9\frac{1}{2}$ lines.

Expansion $15\frac{1}{2}$ lines.

Sordide helvolus glaber capite (antennis mandibulisque badiis exceptis,) atro, facie valde prominente in medio subsulcatâ, pedunculo abdominis quadrato gibboso.

Fuscous, opaque, glabrous, excepting beneath the thorax, coxæ, peduncle, and apex of the abdomen, all of which have moderately long hair : head deep black, except the mandibles, which are dark chestnut ; the face very prominent, subsulcated beneath the anterior ocellus ; the ocelli placed in a triangle, the anterior at the distance of the diameter of one from the posterior pair : eyes subglobose, very prominent ; scape of the antennæ very short, (the remainder deficient) ; mandibles very broad, with a large obtuse triangular projection at the base within, leaving no space between them when closed, their inner edge acute.

Thorax darker than the abdomen, gibbous in front and at the scutellum, which is transverse and rounded at the apex ; metathorax considerably produced and fringed : wings fuscous, their nervures black, the cubital thick and undulated, the recurrent inserted just beyond the middle of the first submarginal cell, straight ; legs castaneous, their knees pitchy, the femora rather broadest at the base, their outline nearly parallel.

Abdomen elongate, cylindrical, obscure, peduncle subquadrate, gibbous, ventral portion very slightly angularly produced, less than the following segment, all of which are transverse, the terminal segment smooth and shining and very pilose.

This species is from the Gambia. Although very like the three preceding, it is very distinct in the form of its head, mandibles, and femora. It is the smallest of the genus, and singularly enough leads off to the next by the left superior wing, which has an abbreviated portion of a pseudo second recurrent nervure ; by an unlucky accident I destroyed its antennæ, and therefore cannot give their proportions.

Genus 4. *RHOGMUS*, Shuck.

Body elongate, much curved downwards at the apex, cylindrical and clavate.

Head short, transverse ; face slightly protuberant.

Antennæ short, setaceous, curved, inserted within the inner basal angles of the mandibles upon the margin of the nearly obsolete clypeus, the scape about one-fourth the length of the whole organ, the apex of which will not extend to the insertion of the wings.

Eyes large, lateral, globose, and very prominent.

Ocelli large, placed in a triangle on the vertex.

Mandibles triangular, edentate, slightly curved at the apex, very much compressed, convex externally and concave within.

<i>Labrum,</i>	} As in <i>Dorylus</i> .
<i>Maxillæ,</i>	
<i>Maxillary and</i>	
<i>Labial palpi,</i>	
<i>Thorax,</i>	
<i>Tegulæ,</i>	

Superior wings as in *Dorylus*, but not extending much beyond half the length of the abdomen, with one internally angulated marginal cell and two submarginal cells, the first of which is considerably the longest, two recurrent nervures, both of which are received by the first submarginal cell, the first recurrent rather beyond its centre, and the second near the latter, but diverging towards the apical margin of the wing: the nervures of the wings very robust.

Legs as in *Dorylus*.

Abdomen elongate, clavate, much curved, the basal segment forming a transverse convex posteriorly truncated peduncle; the penultimate dorsal and ventral segments considerably larger than the preceding, the terminal dorsal segment also largely developed, emarginate at its extremity, where, as well as its ventral valve and the ventral penultimate, it is densely fringed with long silky down. The genital organ largely developed and differing considerably from that of *Dorylus*.

Type of the genus, *Rhogmus fimbriatus*, Shuck.

Named from *ῥωγμός*, a *fissure*, in allusion to the deep emargination of the terminal dorsal segment of the abdomen. The claim of this remarkable insect to constitute a genus is substantiated by its two recurrent nervures, its very clavate abdomen, and the large development of its penultimate and terminal segments. In the peculiar emarginate structure of the latter it resembles *Labidus*, but in that genus the emarginate portion of the segment is vertically compressed. The very different structure of the large genital organ exhibits an absolute necessity for its separation from *Dorylus*, which although the general structure be the same, it is very different in form, for the lateral fornicate valves (the external sheath, *Burm.*) are widely separated and compressed flatly at their apex, where they are externally and above very hairy, the hair all curled; and within at the same part they are also flat, but glabrous and horizontally truncated at the apex: the central process (the penis) is considerably larger in proportion to the whole organ, vertically broader, narrowing towards its apex, where it suddenly enlarges into a boat-shaped clava, which has a deep and separating incision down its centre; the lateral processes (the inner sheath) which spring from the base of the large lateral valves, and which here embrace the base of the central organ, are here shorter than in *Dorylus*, and form large com-

pressed plates very hairy at their apex and beneath, and the horizontal piece which articulates at the base beneath the large valves is here dilated into a broad lanceolate plate, deeply emarginate at its apex.

Sp. 1. *Rhog. fimbriatus*, Shuck.

Length $17\frac{1}{2}$ lines.

Expansion 22 lines.

Helvolus, pilosus; *abdomine glabro, segmento ultimo supra et duobus ultimis subtus fimbriatis*; *capite, (clypeo antennis mandibulisque castaneis exceptis) nigro, nervis alarum brunneis et pedunculo abdominis transverso-quadrato, convexo.*

Rufo-testaceous very pilose upon the face, the thorax above and beneath the coxæ also beneath the peduncle of the abdomen, and the margins of the terminal segment above and of the two last beneath, which are densely fringed. The head black upon the vertex and behind, face convex, sulcated in front of the anterior ocellus: the ocelli large, disposed in an equilateral triangle on the vertex, with about the diameter of one intervening between the anterior and posterior pair; antennæ slender, setaceous, the scape one-fourth the length of the organ; mandibles broad, nearly triangular, very slightly curved, the inner edge acute.

Thorax gibbous in front and at the scutellum, which is very pilose, prothorax very distinct, and metathorax slightly produced and rounded posteriorly; wings subhyaline, their nervures robust and brown, the radial lost in a large dilated dark patch at the commencement of the marginal cell; the cubital slightly undulated, the first recurrent inserted just beyond the middle of the first submarginal cell, and the second recurrent half way between the first and the termination of the cell, and diverging obliquely towards the edge of the wing; legs castaneous, the femora elongate, ovate, compressed, their outline slightly rounded above and below.

Abdomen opaque, clavate, the peduncle transverse quadrate convex, fringed at its apex and very pilose beneath, where it is slightly longitudinally carinated, not so wide as the second segment, which viewed above is nearly quadrate, the remainder all transverse: of these the penultimate and terminal are the largest, the latter deeply emarginate in the middle, fimbriated along the edge, as are also the two last ventral segments, the terminal of which is semicircular and the penultimate nearly quadrate. In the collection of the British Museum, and in my own.

This remarkable insect is from the Gambia; it is the largest of the family, and its generic description and the observations thereon will exhibit its distinction from all the rest of the family.

Note upon Typhlopone.

The preceding pages were at press when I discovered in the collection of the British Museum an apterous insect from Sierra Leone,

brought thence by the Rev. D. F. Morgan, which appears to be the African representative of *Typhlopone*, with which it agrees in many points of resemblance, but is sufficiently different to constitute another genus, should it eventually prove that *Typhlopone* is distinct from *Labidus*. This African insect agrees with *Typhlopone* in the disproportionately large size of the head, which is also subemarginate behind; in having neither eyes nor ocelli; in the insertion of the antennæ (but which is within two deep fossulets, the inner edge of which is not continued in a carina), and in their having but eleven distinct joints and slightly clavated; in the general form of the mandibles; in the peduncle of the abdomen, which is convex above; and in the apex of the abdomen being furnished with three minute teeth. I propose to call it

ANOMMA, Shuck.

for it differs from *Typhlopone* in the head being considerably widest in front, at the base of the mandibles, which are elongate, forcipate, much curved, with one large curved tooth at about half their length; in the thorax being constricted, especially at the sutural separation between the pro- and mesothorax; the latter and the metathorax very narrow: the antennæ and legs very slender, the latter long and their femora not clavate, the peduncle of the abdomen very narrow, and the segments but slightly constricted.

Type *Anomma Burmeisteri*, Shuck.

Sp. 1. *A. Burmeisteri*, Shuck.

Entire length 6 lines.

Nigro-piceus, nitidus, glaberrimus: antennis pedibusque rufo-piceus.

Brightly shining, perfectly smooth, pitchy black, with the antennæ, legs, thorax, ventral incisures and sides of the abdomen pitchy red.

The following are the proportions of this remarkable insect: length of the head, including mandibles, $2\frac{1}{4}$ lines; thorax $1\frac{1}{2}$ line; abdomen, including the peduncle, $2\frac{1}{4}$ lines.

Mr. Thwaites, of Bristol, kindly communicated to me four specimens of *Typhlopone*, including two species distinct from those previously described: they are

15. Lab. (4 *Typhlopone*) *Thwaitsii*, Shuck.

Length 3—5 lines.

Rufo-testaceus, (mandibulis antennisque rufo-piceis exceptis,) nitidus; capite antice sulcato et punctulato.

Bright reddish testaceous and shining; the head sparingly and not deeply punctured, the channel between the carinæ of the face continued about one-third the length of the head and terminating gradually: the mandibles and antennæ pitchy red, the former having their teeth and the

latter their terminal joint obtuse, and these with eleven conspicuous joints.

Thorax scarcely more punctured than the head, the suture which separates pro- and mesothorax curved forwards.

Abdomen having the peduncle subglobose, the segments slightly constricted at their base, slightly retuse at its extreme apex, where it has three minute teeth.

In the collection of Mr. Thwaites.

This species I have much pleasure in dedicating to my friend G. H. K. Thwaites, Esq., an ardent lover and careful student of the Hymenoptera; it is amply distinguished from the *Typh. Kirbii* by the proportions and size of the terminal joint of the antennæ, as also by the different sulcation of the face. The species proves that these insects, of which I had not before seen more than single specimens of any, vary occasionally considerably in size.

16. Lab. (5. *Typhlopone*) Spinolæ, *Shuck.*

Length $1\frac{1}{4}$ line.

Pallide-testaceus, nitidus, mandibulis acutissimis, carinis faciei convergentibus, angulatis.

Entirely of a pale testaceous: head smooth: antennæ having apparently twelve joints arising from the large terminal joint being divided in its middle by a slender dark ring: the carinæ, behind which the antennæ are inserted, immediately converging, forming an elevated angle, the apex of which is continued a short distance up the face, and at its termination there is a slightly indicated fossulet: mandibles having all their teeth very acute.

Thorax slightly punctured, the suture separating the pro- and mesothorax nearly straight.

Abdomen having the peduncle subglobose, and the base of the segments slightly constricted, its extreme apex slightly subretuse, and with three minute teeth.

In the collection of Mr. Thwaites.

This, which is the smallest of all the species, is distinguished from all the rest by the carinæ of the face and the peculiarity of its antennæ: I have seen but one specimen of it.

These two species were accompanied with the following observations by Mr. Thwaites: "Of the *Typhlopone* a great number were given to Mr. Raddon by a gentleman in the sugar trade, and from these I picked out the series inclosed; amongst the multitudes of them I had in my possession I could not discover any but similar ones to those sent, and I concluded from their abundance that they must be a common insect. The gentleman who found them informs me that sometimes upon opening a hogshead of sugar from the West

Indies the surface is completely covered with this species all alive ; he has promised to let me know the next time the circumstance occurs ; I will then look carefully amongst them for the males. It strikes me that the fact of their occurring in such numbers without being intermixed with any other species* militates against your opinion of their being the females of *Labidus* if *Labidus* is a parasitic insect ; not knowing *Labidus* by sight I cannot give an opinion as to the probability of their being the sexes of one genus."

I perfectly agree with Mr. Thwaites, that the remarkable apparition of these multitudes, which seems a not unfrequent circumstance, appears to affect my supposition of their being parasites, but it does not contradict the possibility of their being the females of *Labidus*, nor of their belonging to this family ; and it rather confirms a stronger affinity with the Solitary Heterogyna from three of one species occurring of such different sizes ; for this would certainly be an objection to the possibility of their belonging to the Social Heterogyna, where never more than two differences of size occur in the same sex.

But I have given the whole of the hypothesis, which does not at all affect the descriptive portion of the paper, for no more than it is worth. I build no system upon it ; I have merely suggested it as it occurred to me in the careful examination of these insects ; nor shall I, as is too often the case, identify myself with it and make any difference of opinion a personal matter. The object I have pursued in studying natural history has been to ascertain facts, or in their absence the closest probable approximation to them ; for I am sure, to use the words of our great bard,

‘ Nature is made better by no mean,
But nature makes that mean.’

And she is too protean in her disguises to be fitted by any boddice we may choose to invest her with. It is perhaps therefore the truest wisdom to wait patiently, although searching diligently, until she may discover herself, and the reverse will be no paradox when we endeavour to anticipate or force her disclosures.

* It is not improbable that other species might have been amongst the individuals discovered, as there are clearly two in the four sent to me by Mr. Thwaites.

XXXIX.—*Description of a new Species of the genus Lophotus, from the collection of Charles Darwin, Esq. By G. R. WATERHOUSE, Esq., Curator to the Museum of the Zoological Society, &c. &c.*

THE genus *Lophotus*, founded by Schœnherr* upon an insect from Chile, is placed by that author in his family *Cleonides*, and in the apterous section of that family. But one species of *Lophotus* was known to him at the time of the publication of his second volume; he must now however be acquainted with two species, the Rev. F. W. Hope having sent him two from his own collection. One of these is described and figured by Mr. Hope in the 'Transactions of the Entomological Society,' under the name of *Loph. nodipennis*; to the other he applies the name *trifasciatus*—this, however, I believe to be the same as Schœnherr's species. Mr. Hope also refers the *Curculio Vitulus* of Fabricius to the same genus: there are therefore three species of *Lophotus* known; and as these are now before me, together with the new species I am about to describe, I will endeavour to point out their chief distinguishing characters.

Section RHYNCHOPHORA.

Subsection GONATOCERI.

Family CLEONIDÆ.

Genus LOPHOTUS.

Sp. 1. *Lophotus Vitulus*.

Curculio Vitulus, *Fab. Ent. Syst. tom. 1. pars 2. page 479. spec. 356.*

"*C. brevirostris niger fronte bidentatâ, elytris unispinosis.*

Habitat in Terrâ del Fuego. *Mus. Dom. Banks.*

Caput nigrum *rostrum* canaliculato. *Inter oculos dentes* duo elevati, acuti. *Thorax* rugosus, ater anticè punctis duobus elevatis.

Elytra carinata, rugosa, atra, posticè spinâ elevatâ, acutâ.

Pedes nigri."—*Fab.*

Two specimens of this species form part of Mr. Darwin's collection; one of them is from Hardy Peninsula, Tierra del Fuego, taken in the month of March; and the other is from

* 'Genera et species Curculionidum,' tom. 2, pars prima, p. 314.

Tres Montes, "found on a bare granite mountain, at an elevation of 2500 feet." They have been compared with the original specimen in the Banksian collection. The length of this insect varies from 9 to 10 lines (without including the *rostrum*, which is rather more than 1 line in length), and its greatest width is from $2\frac{3}{4}$ to 3 lines. The general colour is black or pitchy-black. The *rostrum* is elevated between the *antennæ*, and there are two longitudinal grooves in this elevated portion: on the head between the eyes are two distinct obtusely pointed tubercles. The *thorax* is nearly cylindrical, but obscurely dilated in the middle; its upper surface is covered with strong irregular *rugæ*, which are for the most part in a transverse direction; besides these irregular ridges, there are two tubercles situated close to the anterior margin. The *elytra* are of about the same width as the *thorax* at the base, but towards the hinder part they are dilated; their upper surface is convex, and at the sides they are compressed—the general form of the body however approaches to cylindrical. The anterior angles of the *elytra* are slightly produced, and the apical portion is rounded: on the upper surface they are deeply and coarsely punctured; these large punctures are near each other and leave strongly elevated *rugæ*, and these *rugæ* are most elevated in the transverse direction, the punctures having a tendency to run into each other in that direction: on the hinder part of each *elytron*, about 2 lines from the apex, is a large angular tubercle. Each segment of the *abdomen* beneath is convex and somewhat coarsely punctured; and on the last segment two large *foveæ* are observable. The legs are moderately long.

A specimen of this, as well as of each of the other species here described, is deposited by Mr. Darwin in the Museum of the Entomological Society.

Sp. 2. *Lophotus longipes*, nov. spec.

Loph. niger, rostro longiusculo, culmine elevato, capite rugosè punctato; thorace suprâ lineis irregularibus elevatis transversim, lineâque elevatâ longitudinali, notato; margine antico elevato: elytris punctis grandiusculis longitudinaliter in lineis crebrè depositis; tuberculis permagnis, apud partem posticam, apice producto et acuto; abdominis segmentis subtùs in medio lævi-

bus, ad latera punctis necnon squamis flavidis vel albis obsitis; apud metathoracem squamis pallidis lineam lateralem efficientibus; scutello albo; pedibus longis.

Of the species of *Lophotus* known, the present could only be confounded with the *Loph. Vitulus*, but from that it may be distinguished by the following characters:—the *rostrum* is longer, and instead of having a bisulcated elevation between the *antennæ*, it is furnished with a central longitudinal ridge, which is considerably dilated in front of the *antennæ*, where it exhibits a shallow longitudinal depression in the middle; the *antennæ* are longer: the tubercles over the eyes are here wanting: the anterior margin of the *thorax* is raised into a fold, but it does not present the two tubercles observable in *Loph. Vitulus*; the irregular *rugæ* on the *thorax* are moreover less distinct; the *elytra* differ in having the posterior portion produced into a point, the posterior two tubercles much larger, and the sculpturing less deep. In addition to these characters, the comparative smoothness of the segments of the *abdomen* beneath, and their being furnished with pale scales on the sides, together with the proportionately great length of the legs, will serve to distinguish *Loph. longipes* from *Loph. Vitulus*. The *scutellum* is white. The length of this species is 9^{'''}, and its greatest width is 3^{'''}; the length of the *femora* and *tibiæ*, taken together, is 5 $\frac{3}{4}$ ^{'''}, whereas in *Loph. Vitulus* the same parts measure only 4 $\frac{1}{3}$ ^{'''}. Mr. Darwin found this species in Hardy Peninsula, Tierra del Fuego, and at Cape Tres Montes.

Sp. 3. *Lophotus nodipennis*, Hope, Transactions of the Entomological Society of London, vol. 1. p. 15. pl. 1. fig. 5.

L. “ater, rostro canaliculato posticè niveo, elytris unituberculatis, maculæque albidâ inter tubercula et apicem positâ. Long. corp. 10^{'''}. Lat. 2 $\frac{1}{2}$.”

Habitat apud Conception Americæ Meridionalis.” Hope.

This species is at once distinguished from either of the others here noticed by its less deep sculpturing, but more particularly by the white spots by which its legs, abdomen, and apical portion of the *elytra* are adorned. These patches of pale scales are observable in the following situations:—1st, there is a patch on the basal portion of the rostrum, another on

each side of the thorax, one on the trochanter of each of the 4 anterior legs; a longitudinal row of spots adorns the under side of the abdomen, one to each segment, and the two basal segments have moreover a spot on either side; a large patch is situated on the apical portion of each elytron, and all the femora have a pale ring near the apex: the colour of these spots is sometimes white, sometimes yellow, and occasionally some brilliant pale blue scales margin the white ones, especially on the legs, and a patch of blue scales is generally apparent beneath the spots on the apical portion of the elytra. Several specimens of this species were brought home by Mr. Darwin; some of them are from Chiloe, and others from Ynche Island, Chonos Archipelago.

Sp. 4. *Lophotus Eschscholtzi*, Scho. Tom. 2, pars prima, p. 316.

Lophotus trifasciatus. Hope, MS.

L. niger, squamis albis dispersis; elytris fascias tres latas et albas exhibentibus, necnon ad apicem notam albam: tuberculis duobus parvis et angularibus super oculos; thorace punctis confluentibus; elytris insigniter punctato-striato.

This species is readily distinguished from either of the preceding by the black and white *fasciæ* which adorn the *elytra*. It agrees with the description of *Lophotus Eschscholtzi*, if we may suppose Schœnherr's specimen a little rubbed. In perfect specimens the *elytra* (which are shorter and broader than in other species) are densely clothed with white scales, excepting in certain parts, and these unclothed portions form *fasciæ*: a small black spot is observable on each shoulder, a triangular black patch (sometimes confluent with the shoulder-spot) on the *scutellum*; behind these are two black *fasciæ*, the first of which is interrupted in the middle; and on the apical portion of the *elytra* is an irregular black mark. On the head, *thorax*, legs, and the whole of the under parts of the body, are scattered white scales.

One specimen of this insect was brought from Valparaiso by Mr. Darwin, who says "it first appears in November, is very abundant, and injurious to the young shoots of plums and peaches."

XL.—*Description of a new Species of Balanus, from the Cabinet of Samuel Wright, Esq., of Cork.* By the Rev. WILLIAM HINCKS, F.L.S.

MR. WRIGHT, who is a zealous collector in several departments of Natural History, and is well known from his valuable contributions to the fossil conchology of the interesting district in which he resides, transmitted the species now to be noticed to the present writer to be examined and compared with the specimens in the British Museum, and on finding that it is undescribed, requested that some account of it might be communicated to the public.

This animal may perhaps belong to the genus *Balanus*, though Mr. Gray is of opinion that it must form the type of a new genus, and it is a question which may be left for future decision.

It is attached to the common turtle. The shell consists of six valves, slightly cohering, unequal in size, the smallest and largest being opposed to each other, each valve externally marked by two or three strong ridges meeting towards the apex, sometimes further branched below, which penetrate the bone of the turtle like the fangs of teeth, and appear to enter the fat underneath. They at length almost, perhaps altogether, cut out the portion of bone on which the *Balanus* stands, so that the removal of the shell would leave a roundish hole. The opercular valves are lost in Mr. Wright's specimens, which were injured in cutting up the turtle. The diameter of the base in the largest specimen is 1·8 inch. The *Balanus* being firmly attached to the bony covering of the turtle, which it penetrates in the manner described, protrudes through the horny exterior shell; but a young specimen apparently of the same species is fixed to the internal surface of the horny shell, not having yet either attached itself to the bone or forced its way through the outer covering.

A specimen in the British Museum which seems to be of the same species, though the fangs are less developed, had its peculiarity of appearance attributed to accidental injury, until a comparison with Mr. Wright's specimen showed its real nature.

It is a curious subject for inquiry, by what means, whether mechanical or chemical, this *Balanus* is enabled to penetrate the hard bone of the turtle as well as its outer shell, and also what is the relation of this arrangement to the œconomy of the animal.

I venture to propose as a name for the species *Balanus chelytrypêtes**.

XLI.—On the Effects produced upon Animal and Vegetable Life by the Winter of 1838. By P. J. SELBY, Esq., of Twizel House.

THE severity with which the year was ushered in by the long-continued frost during the months of January, February, and a part of March, the cold and long-retarded spring, succeeded by a chilly and ungenial summer, as well as a late and deficient harvest, place the year 1838 upon our records as one of peculiar, though happily of unwonted character. Under circumstances of such a nature, and which it is more than probable may not again occur during the limit of the present generation, a few observations upon the effects of so severe a season, as connected with animal as well as vegetable life, more particularly as affecting our own district, may perhaps prove not altogether uninteresting to the members of the club†. It will be in the recollection of those who attended to the weather, that, up to the 5th of January 1838, the season, with the exception of the first week of the previous November, when we experienced a severe but cursory snow storm, had upon the whole been temperate and mild: this was particularly the case on Christmas, and two or three following days, when the thermometer ranged from 52° to 55°, at which time, I may remark, many of the thrushes which still remained inland, were heard recording in distinct and audible key, thus flattering us with the hope that winter had divested herself of her characteristic garb, and that these sweet carols were to be the prelude of an early spring. These halcyon days, however, were of short duration, as, on the 6th of January, frost set in, accompanied in this district by showers or falls of snow and hail, which, in consequence of the calm state of the atmosphere, fell level upon the surface. It thus continued falling at frequent intervals, more or less, for nearly

* *Chelys*, Gr., a turtle, and *trypêtes*, a Greek word signifying 'one that perforates.'

† From the Transactions of the Berwickshire Naturalists' Club:—see p. 129 of the present volume.

a fortnight, when the snow had accumulated to the depth of ten or twelve inches over the whole surface of the country, the frost at the same time continuing to increase in intensity, till every brook and pool was locked up in ice and frozen snow. In consequence of this deep covering, the birds, particularly those of the insectivorous tribe, or whose chief pabulum consists of worms and insects, soon began to feel the effects of famine; and blackbirds, redbreasts, hedge-sparrows, &c. were reduced, at a comparatively early part of the storm, to a deplorable state of weakness, and were daily found dead or dying from the combined effect of hunger and cold. Many fieldfares also perished at this early stage of the frost, though the great body of this emigratory species, soon after the commencement of the storm, moved southwards; the thrushes also, which I have previously observed were singing at Christmas, entirely disappeared, a precaution I have observed for many years to take place in regard to this species, whenever a storm or frost of any continuance has occurred. I may remark, that previous to the commencement of the storm, all the haws and other berries which are the occasional food of the thrush tribe, had been devoured by them, so that no resource of this nature was left them to fly to when the frost first set in. About this period of the storm, that is, after a fortnight's continuance, the arrival of a great variety of the rarer kinds of water-fowl along the line of coast proclaimed the intensity as well as the wide-extended range of the cold. Wild swans then made their appearance in flocks, and for two or three weeks several of these birds took up their residence in Buddle Bay, when, as may be supposed, their unwonted presence caused an active pursuit, and many individuals were shot. Among them, I may mention two that were taken alive, having been wounded, but only so as, in conjunction with their reduced condition, to incapacitate them for flight; these soon became very tame, and were afterwards placed by W. B. Clark, Esq. of Belford Hall, in a piece of water, where one of them continues to thrive, and now associates with a common goose; the other died during the course of the summer, apparently from the effects of some internal wounds it had received. Both of these were of the common or elk species (*Cygnus ferus*), nor did any specimen of *Cygnus Bewickii* come under my observation, though I am aware that a few individuals of this species were taken in other parts of the kingdom. In other districts of the country, and in the South of England, the destruction of these beautiful and noble birds was very great. Among the rarer species of water-fowl killed upon our coast, the following are deserving of notice. *Larus minutus* (Little Gull) near Embleton, the first instance, I believe, of its occurrence upon the Northumbrian coast; this is

now in the possession of our brother member, Mr. R. Embleton. Several specimens also of the *Mergus albellus* (Smew), in the adult male plumage, in which state it is considered a rare bird, were killed upon different parts of the coast; and of *Podiceps rubricollis*, far from a common species, I saw several instances. Many specimens of the different *Colymbi* (Divers) were also shot, and wild-ducks, wigeons, brent-geese, scaup-ducks, pochards, tufted-ducks, and golden-eyes were very plentiful. Upon the southern coasts of England an equal or even greater influx of water-fowl took place, and the destruction, as may be conceived, was comparatively great. In Hampshire, I am informed, that a noble sportsman, who rented a small part of the coast expressly for the shooting of wild-fowl, killed during the storm the extraordinary number of 515 head of various kinds, among which were thirty-seven swans. This warfare upon the aquatic tribe continued for six or seven weeks, and it was not till the middle or latter end of March, that the wild-fowl began to shift their quarters, or yield to that influence which directs their migratory movements to the higher latitudes on the first approach of spring. Before a thaw took place, many of our hardy indigenous and resident land birds also suffered from the intensity of the frost and the want of food; partridges and pheasants were found dead in every direction, and even the hardy muir-fowl upon the higher grounds were many of them frozen to death. In Edinburgh, I am informed, that for weeks, after the first ten days of the storm, baskets full of partridges and other game were brought to the poulterers, which had died or had been caught in a dying state, and when taken into the hand were found so reduced as to be a mere collection of bones and feathers. Four-footed game also did not escape with impunity, and during a great part of the storm, their only food, in this district, was the bark and twigs of such underwood and young trees as appeared above the snow. But it was not in those districts alone in which the snow lay deep upon the surface, that animal life suffered from the severity of the season, for I find that in Dumfriesshire and other parts along the western coast, where the fall of snow was very trifling, and scarce whitened the surface, great mortality nevertheless prevailed amongst the feathered race, all access to food having been as effectually prevented by the stony hardness of the earth, as it was where the hoary covering hid everything from view.

We now turn to the effects of the frost upon the vegetable fibre, and here we find evidences of its intensity equally striking, and as fatally injurious to certain plants as it was to animal life. In this district its severity was plainly demonstrated by the appearance of our hardy native, the common whin; this shrub, wherever fully ex-

posed, or in so far as it remained uncovered by the snow, was completely destroyed, for a proof of which I have only to evidence its unsightly appearance at the present moment. The common bay and Portugal laurels also suffered severely whenever exposed to the south-east blast, and many of them still remain in a dubious state of existence. The laurustinus, which had flowered and grown luxuriantly for many years past in this district, has most of it been destroyed to the root; and I find that even such plants as remained partially green during the last summer, in consequence of some slight nourishment from the stem, are now all withered and dead, a result, however, I had anticipated from the appearance of the bark when it was examined last spring after the melting of the snow. In the midland and southern parts of England, where a still greater degree of cold prevailed, as indicated by the thermometer, and where no protection was afforded by a deep covering of snow, the destructive effects of the frost were more extensive, and few, except the hardiest evergreens, escaped without more or less injury, some being killed outright, others destroyed to the root, or totally denuded of their leaves; and it so happened, that many shrubs and trees, which in the North of England and Scotland showed but trifling symptoms of injury, were, further to the south, unable to resist the rigour of the cold. Thus, in a few short days, or perhaps hours, perished most of those beautiful evergreens and other ornamental shrubs which add so essentially to the elegant appearance of our country residences, and which form so prominent and peculiar a feature in English ornamental gardening; many of these had attained a growth of thirty or forty years, and were flourishing in the greatest perfection, having braved our usual winters without suffering any material injury. The loss, I may add, is still more severely felt, as time alone can repair it; and it is only the young and rising generation who can, even under the most favourable circumstances, again expect to behold a new succession equal to that which perished in the winter of 1838. Among the evergreens which showed an aptitude to bear an unwonted degree of cold uninjured, or only injured to a trifling extent, the Holly, the Rhododendrons *Ponticum*, *catawbiense*, *ferrugineum*, &c., the Yew, Box, Arbor Vitæ, and the Red Virginian Cedar, stood conspicuous; the Portugal Laurel also, except in very exposed situations, was not materially injured, and the common or large bay-leaved Laurel, in our own premises, escaped in most instances with the loss of the tender part of the shoot of the preceding season. Of the degree of cold experienced during the continuance of this storm, we have authentic accounts of the thermometer having descended to 4°

and even 7° below zero, or 36° and 39° below freezing, in the mid-land and southern parts of the island. In this and adjacent districts it does not appear to have reached this intensity, the following being observations on which dependence can be placed. At Kelso, 140 feet above the sea-level, it fell to 3° F. on the night of the 21st of Jan. 1838, and during the continuance of the storm was frequently observed at 5° and 8° F. At Mellerstein, about 500 feet above the sea, a self-regulating thermometer of Adie's marked it at 2° F. during the nights of January 20 and 21, 1838. At Greenknow, near Gordon, and considerably higher than Mellerstein, 3° F. on the night of 21st January. And at Mertoun House about the 14th or 15th January, a common thermometer was observed 2° F., and again on the morning of January 21 at 2° F. Early in March the frost abated in rigour, and a slow thaw began to melt the vast accumulation of snow which had been drifted into the lanes, hollows, and hedge banks by the severe and oft-repeated gales that had occurred during the two months' frost. Up to this period none of those indications which we had been accustomed to hail as the harbingers of spring had been observed, such as the song of the misselthrush and the mavis, the cooing of the ringdove, or the pipe of the golden plover, which in usual seasons seldom fail to greet our ears with their welcome notes before February has advanced into the second week. On referring to my notes, I find it was not till the 5th and 6th of March that the peawit and golden plover were first seen, or the carol of the lark heard; on the 7th the thrush and missel-thrush were in song, being a period later by nearly a month than any I can find in a register kept for many years past, and it was not till the 20th that the congregated flocks of the ringdove began to disperse, or that they were heard cooing and exhibiting that peculiar flight which distinguishes the species at the time of pairing, and which in ordinary years seldom fails to occur before the 8th or 10th of February. It was now that the effects of this long-continued storm, so remarkable for the great degree of cold that accompanied it, became fully apparent; for instead of the host of birds that were wont to resort to our groves and plantations at this season, and whose "wood-notes wild" used to greet us in every direction, a few individuals or a solitary pair alone were to be seen; and where, a season or two before, a united concert of a multitude of thrushes might have been listened to on a calm mild spring evening, not more than two or three at far distant stations could now be heard; of our familiar attendant the red-breast, few survived to pour forth their impassioned lay, as the diminished numbers of this favourite bird, even after the increase of the

year, clearly demonstrate. The same may be said of the blackbird, whose mellow whistle was scarcely recognised during the spring and summer; and a like falling off was observed in regard to the wag-tails, wrens, and indeed all the indigenous insectivorous species, which suffered to a much greater extent than the *Conirostræ* or Finch tribe, which subsisting upon seeds and grains, found, if not ample, at least a sufficient quantity of food to support life in the stack and fold-yards where the others were perishing from the effects of hunger and cold. But the deficiency of the feathered tribe this year, I afterwards ascertained, was not confined to our indigenous or permanent residents: it extended to all those species which we call summer visitants, or which make our island their breeding resort and habitat during their polar migration; for as the time of the arrival of the various species successively occurred, I found that throughout this district their numbers scarcely averaged a third of the usual supply, and this falling off not confined to a few particular forms, but extending to all the migratory species. The same was observed to prevail in the South of England, as in a communication from Mr. Yarrell, he mentions that the paucity of summer visitants had been generally remarked by those who interest themselves in ornithology and observations connected with it. The cause of this deficiency I attribute to the very cold and ungenial weather which prevailed not only throughout Britain, but over a great portion of the European Continent, at the time these birds usually undertake their periodical flights, and which, I imagine, stopped many on their course, and prevented that extended movement, which, in ordinary years, permits their reaching our own and even higher latitudes. That their lessened numbers arose from causes which affected them during their winter sojourn can scarcely be supposed, as that portion of the year, it is now well ascertained, is passed by most of them in the warm region of the African Continent or in those parts of Southern Europe where frost is scarcely known. Some few may undoubtedly have perished on the way, or from having advanced at too early a period into the North of Europe, where, in consequence of the chilling cold that prevailed, no appropriate food could be found, and thus died of hunger; but the more probable reason is, I think, that already assigned, viz. that they were stopped on their advance by the peculiarity of the season, and were compelled to remain and nidificate in lower latitudes than they are generally accustomed to do. Of the few which did arrive, it was observed that their first appearance was nearly a fortnight later than has generally been the case, upon an average taken from a register of some twenty years

past. Thus I find that the Willow Wren (*Sylvia Trochilus*), instead of the 16th or 18th of April, was not seen or heard before the 3rd of May; the same in regard to the Blackcap (*Curruca atricapilla*), the Tree Pipit (*Anthus arboreus*), the Whinchat (*Saxicola rubetus*); and the 13th of May had arrived before an individual of the Flycatcher (*Muscicapa grisola*) was observed. Of the species just enumerated, a deficiency, such as I have already mentioned, was remarked; but I think it was even more striking in others, among which I may particularize the Sedge-warbler (*Salicaria phragmitis*), Greater Petty-chaps (*Curruca montana*), White-throat (*Curruca cinerea*). To this cold and long-retarded spring, succeeded a short and, with the exception of a few days in July, a moist and chilly summer, circumstances which affected not only the increase of animal life, but produced the more serious calamity of a deficient harvest. Fruits also did not ripen at all, or very imperfectly, and were devoid of their proper taste and flavour. In conclusion, I may add, that a great deficiency of the insect tribes was generally remarked, and, from having given a considerable degree of attention to the entomology of this district for some years past, I can confidently say, that in most of its great families or divisions the remark is correct, more particularly as it applies to the Coleopterous and Lepidopterous insects, upon a comparison with what was observed in 1835 and 1836, as well as years previous to that date.

XLII.—*Information respecting Botanical and Zoological Travellers.*

It will give satisfaction to many of our friends to learn that letters have been received from our valuable contributor Dr. Parnell. He is now about to leave Jamaica, after a residence of nearly nine months, during which time he has investigated much of the zoology of that island. His entomological collections have suffered considerably from insects, but in ornithology he states, "I have been more fortunate, having obtained 140 species in a good state, several of which are very rare, and two or three of them I suspect have never been before noticed. In ichthyology I have been most successful, having obtained about 500 specimens." At the date of his letter (22nd March), Dr. Parnell was about to sail for Cuba, whence he expected to return to Britain in November or December next.

WE have also letters from another gentleman, T. C. Jerdon, Esq., Assistant Surgeon 2nd Madras Light Cavalry, who has been for some

years resident in India in the prosecution of his profession, and has employed his leisure time in studying the zoology of that country, particularly its ornithology. Our parcel contains a partial result of researches in the latter department in the first part of a "*Catalogue of the Birds of the Peninsula of India, with brief Notes on their Habits and Geographical Distribution**;" and notwithstanding the information contained in the illustrated works of Hardwicke and Gould, and in the valuable Catalogues and Papers of Franklin, Sykes, Hodgson, and Eyton, several species among the Raptores are given as new, Mr. Jerdon divides the peninsula into four great districts or divisions. 1st, *The Northern Circars*, comprising a narrow tract of land (between 16° and 20° N. lat.) from the sea-coast on the eastern side of the peninsula to the Eastern Ghauts, by which it is separated from the Great Table-land; 2nd, *The Carnatic*, including the whole of the country lying south of the Northern Circars along the coast as far as Cape Comorin, and bounded on the west by the Eastern Ghauts, except the Coimbotoor district, where the eastern as well as western range is broken; 3rd, *Western coast*, including Travancore, Cochin, and Malabar, and comprising a strip of land of various width lying between the sea on the western side of India, and the range of Western Ghauts, which it includes; 4th, *The great central table land*, including Mysore, the Baramahl, the ceded districts (Bellary and Cud-dapah), the kingdoms of Berar and Hyderabad, the Southern Mahratta country and the Decan.

The species already noticed in this range are 390, and the list will probably be extended before the completion of the catalogue, which now reaches only to a part of the Strigidæ. Of the Falconidæ 32 species are noted; and among those belonging to the British list we have *Pandion Haliaëtos*, *Aquila Chrysaëtos*, *Circus cineraceus* and *rufus*, *Falco peregrinus* and *Tinnunculus*, *Accipiter fringillarius*, and *Astur palumbarius*. It is possible however that some of these may require a more rigorous comparison with the birds of Europe. This part of the catalogue is illustrated by a lithographic figure of an owl (*Huhua pectoralis*), very neatly engraved; and if figures can be produced in India equal to that now attempted, they will be of much importance in illustrating the views of the gentlemen who may in future attend to the zoology of this very interesting region. Our correspondent states, "I have 50 or 60 drawings in the same style†, drawn by myself and finished by the native artists I kept at Trinco-

* Published in the Madras Journal of Literature and Science for September 1839. The Raptores.

† Specimens accompany the packet well drawn and beautifully finished.

nopoli, most of them of birds hitherto unfigured. I shall commence sending my specimens next month, and hope by the end of the year to have forwarded to you a series of all I have procured, for the identification of species, &c. As you requested, I now add a few remarks on the Indian Fox and Wolf. *Canis Bengulensis*, Shaw, *C. Kokree*, Sykes, lives chiefly on the open plains, burrows in the ground, generally four or five openings to the burrow, some of which communicate with each other; others are blind: it feeds chiefly on lizards, locusts, grasshoppers, beetles, small snakes, and occasionally crabs and rats; runs with remarkable speed; the chase with greyhounds is a favourite pursuit in India.—*Canis Lupus*, *C. pullipes*, Sykes, Wolf: hunts in small packs and runs down antelopes and hares, seizes also sheep in a very daring manner in daylight, and carries off young calves, goats, sheep, &c. during nights, and not unfrequently children. It possesses great speed and most extraordinary powers of endurance. Though often chased by the best horsemen, unless it is gorged, it always outlasts the fleetest horse, keeping generally 20 or 30 yards ahead at whatever pace the rider may go.”

Dr. Krauss's Return from Southern Africa.

It will be remembered, that about two years and a half since, Dr. Ferdinand Krauss of Stüttgard, left England for the Cape, on his way to explore the interior of Southern Africa, with a view to collect objects of Natural History from those regions. He has within the last month returned to London with his extensive collections of both animals and plants, collected principally in Natal and Amazoola land, where he resided about twelve months; during which period he assiduously devoted the whole of his time and attention to preserving objects in every department of natural history. The zoological collection comprises Mammalia, Birds, Fishes, Amphibia, Crustacea, Insects, Shells (land, freshwater, and marine.), Zoophytes, &c. The Botanical collection comprises about 3000 species of native plants, carefully preserved, and in most instances 30 specimens of each species; those of Natal, amounting to about 1000 species, are offered to botanists at forty shillings the hundred; and those collected in the Cape Colony at twenty-five shillings per hundred species. A series of the zoological and botanical collections we understand are about to be purchased by the British Museum; the remaining sets will be disposed of to those desirous of possessing them.

In addition to the above collections Dr. Krauss attentively ex-

amined the geological features of the country through which he travelled, with a view especially to record the exact position and situation of the *coalfields*, very imperfectly known to the farmers in the interior of Africa. He has brought with him specimens illustrative of the different formations, including the coal and fossils from the beds: we anticipate giving a more detailed account of this traveller's expedition in a future Number.

Mr. Schomburgk's recent Expedition in Guiana.

[Continued from p. 288.]

I HAVE been told of eight varieties of Opossum which inhabit Guiana, five of which have come under my notice. I have identified four species with those described by authors, as *Didelphis cancrivora*, L., *D. quica*, Temm., *D. philander*, Temm. and *D. dorsigera*, L. and Temm.; but the fifth appears to me to stand intermediate between *D. virginiana* and *D. Azarae*, Screb. Temm. It differs from the latter in the absence of the black markings on the head, black neck, and the black and white ears, which in the Guiana species are of a uniform black colour. If we could reconcile the geographical distribution of *D. virginiana* over a space so different in temperature, I should consider the specimen which I am now describing a variety of that species: the circumstance that the ears are of a uniform black would scarcely constitute a specific difference. Its body from the nose to the insertion of the tail measures 15 inches and a half, the tail 15 inches. The latter, which is prehensile, is for the length of 3 inches clothed with thick fur, the remainder scaly for about 4 inches, of a black colour, and afterwards white. The scaly part is covered with a few short hairs, black on the back part, and white for the remainder. The fore leg to the malleolus measured 3 inches, the hind leg 4 inches. The fur is of a brownish yellow, short and silky, but intermixed with longer hair of white colour and somewhat stiff. These white hairs are along the vertebral line from 4 to 5 inches in length, intermixed with shorter silky hair, which being black above and white beneath, give it the appearance of a black band stretching from the head along the back to the insertion of the tail. The fore and hind feet are of a dark mouse colour, intermingled with a few white hairs. The ears somewhat compressed at the base, naked, black, and about 1·2 inch in length. Round the eyes is a dark spot of an oblong figure, but otherwise the head is almost entirely of a brownish yellow. The neck is covered with the same short fur of a brownish yellow as the belly, while in *D. Azarae* it is of a black colour. The specimen which has served

me for description was shot in the neighbourhood of Georgetown, but as it was the only one of its kind which I ever saw, I hesitate to establish it as a separate species, until I have had opportunity of procuring individuals of the same appearance. It is said to be very common at the coast region, and is called the white Yawarri by the colonists, Nopu by the Warrau Indians, Yawarri by the Arawaks and Macusis. It does great injury to the feathered stock, and frequents the sugar-cane fields, being apparently partial to sweets.

The black Yawarri (*Didelphis quica*, Temm.), called so by the colonists from its appearance when at rest; the hair being long and black at the tip, but yellow towards the root. The tail is longer than the body, clothed with hair for one-fourth of its length, the remainder naked and scaly. Its size is that of a marten, but in its head it resembles a fox, and the muzzle ends with a whitish spot. I do not possess an actual measurement, but I should estimate the length of its body about twelve or thirteen inches, and the tail from fifteen to sixteen inches. The latter, which is prehensile, is of great assistance to them in climbing. They are very destructive to poultry and likewise to fruit. They are often found on those savannahs where the wild pine (*Bromelia*, spec.?) flourishes, to the fruit of which they appear to be partial. Like its congeners, the female possesses a pouch in which she carries and suckles her young until they are as large as half-grown rats. They produce from six to seven young at a time. They sleep during the day and hunt at night. They are sometimes eaten by the Creoles and Indians, but as they have a rank and disagreeable smell I doubt if they would prove palatable to us.

The *Didelphis cancrivora* is too well known to deserve more than a passing remark; moreover, I am not able to add anything about its habits, as it is more peculiar to the sea-coasts than to the interior of Guiana.

The Yawarri cusinai of the Macusi Indians, or Picanappa of the Warraus (*Didelphis philander*, Temm.) has an extensive range in Guiana. It is met with in the coast regions as well as in the interior. It resembles in size a full-grown rat; the fur, short and silky, is of a rust-colour, lighter beneath the belly; length of the body nine inches, tail ten inches and a half, clothed with fur for about two inches, the remainder naked and of a uniform brown colour. A deep furrow divides the nostrils, and the eyes are brown and very prominent, and surrounded by a reddish spot. Possessing all the peculiarities of its tribe, it appears to be more lively than the rest, and climbs with the alacrity of a squirrel. Although I have seen many

in the day time, I am inclined to think that the night is their favourable time for going abroad in search of food. I have had tame ones that slept the greater part of the day. In their wild state they live principally on fruits and insects, but I have been assured by the Indians that they have the art of surprising small birds, and in this I am corroborated by Mr. Vieth, who found animal food in their stomach. In a tame state scarcely anything comes amiss; boiled rice, yams, flesh and fish seem equally agreeable to them.

One of the Opossums of that species which I had in a tame state was a female. It was kept in a birdcage of wire-work which permitted me to watch its habits. I have already observed that it passed the greater part of the day in sleeping, and that it fed alike upon fish or flesh. It might have been in my possession for about a fortnight, when one morning, on feeding it, I observed five young ones of the size of a new-born mouse crawling about in the cage. They were perfectly naked and blind. The mother allowed them to crawl about and did not appear to care for them. Next morning I found only four; the fifth had been eaten by the mother during night; the four remaining ones had however returned to the pouch. The succeeding night two more were eaten by the mother, and the last two were crawling about in a helpless state, and the following day fell a prey to the voracity of their unnatural mother. It is remarkable, that although I had the animal longer than a fortnight, I never was aware that it had young ones until I found them crawling about, and it remains now a riddle to me how the mother could secrete them so well. I thought her with young all the time, but had no idea that they were already in a state so far advanced. Confinement no doubt was the reason of her acting so cruelly towards her offspring. She died a few weeks after.

The fifth species which I have observed during my journeys in Guiana is *Didelphis dorsigera*, L. and Temm. It is nearly the size of the former, its fur of a brownish-gray, the tail thin, covered with hair for about the fifth part of its length, the rest scaly, and of a uniform brown. The spot which surrounds the eyes is of a darker brown than in the former, but it is distinguished chiefly in the females being without an abdominal pouch, and merely provided with longitudinal folds near the thighs, within which the young continue to suckle, or which serves as a place of security in case of danger. I have seen this species in a tamed state; it appeared however shy, and was fed upon milk and bread, and plantains. They are said to be very partial to the latter, and they frequent therefore the plan-

tain fields in large numbers. They produce from six to seven young ones.

An individual of that kind, which had been kept for some time in the house where I resided during my stay in Georgetown, met with a tragical end. I had procured two young Jabirus (*Mycteria Americana*): the first exploit when landed and introduced to their new domicile was, that one assailed the cage which contained the opossum, and having seized the poor animal with its beak, drew it by force through the bars of the cage, and swallowed it without further hesitation.

Having brought these Jabirus under the notice of the reader, I shall leave the class Mammalia, and turn for a few moments to the Aves, in order to indulge in a biographical notice* of these two interesting individuals with an introductory remark on the whole tribe.

The Jabiru or Negrokoop, as it is generally known to such of the colonists who have seen this bird in its natural haunts, frequents the great savannahs of the interior and the marshy environs of the rivers Pomeroon and Guainia, where they live on mollusca, crabs, frogs, and other amphibious animals. While at Pirara, I saw them in flocks of several hundreds feeding at lake Amucu, or on the marshy tracts along the Pacaraima mountains. During our stay in that village several were shot. Their flesh is palatable, and when prepared with the necessary ingredients, as a steak, so strikingly resembles beef, that one unacquainted with the fact would pronounce it such. One was winged in shooting at a flock and was brought alive to us. The bill measured 13 inches; it was laterally compressed, thick at its base, and ended rather sharply. The upper mandible was straight and triangular, the lower rather thicker and slightly turned up. The nostrils are narrow, as the bird seeks its food in the water; the feet with three anterior toes slightly united by a membrane; the hallux, or hind toe, high up on the tarsus.

* These notices of animals which inhabit Guiana are gleanings from my Journal, taken at random as they occur, and without tying myself to any scientific arrangement or description. Those who have thought the preceding observations worthy of their perusal, will be aware that they do not pretend to scientific dissertations; it has been my wish to make the reader acquainted with the manners of such of the animated beings of Guiana as have come to my knowledge and under my personal observation, disclaiming all scientific descriptions and discussions, which we will leave to a period when I may have gained by experience, and when, not further urged by the desire of extending my travels, leisure may permit me to digest what practical knowledge I possess.

From the head to the toes, that is to say, standing upright, it measured $6\frac{1}{2}$ feet, from the tip of the beak to the tail 4 feet 4 inches, and to its end 4 feet 11 inches; from the end of the toe to the knee-joint $1\frac{1}{2}$ foot, from ditto to the thigh-joint 2 feet 10 inches. Its wings when spread out measured $8\frac{1}{2}$ feet; it has therefore, next to the Condor, the greatest extent of wings. Its plumage is pure white; the bill, head, and upper part of the neck are black, and with the exception of a few scattered downy feathers, quite naked. The lower part of the neck is red, and likewise set with a few downy feathers. The skin of the neck, but particularly of the gullet, is generally wrinkled, but the bird can extend it. The neck measured 1 foot 10 inches. A species of *Ampullaria* (*guyanensis*) is found in prodigious numbers in the lakes and swamps, as well as in the rivulets which meander through the savannahs, and it appears they constitute the chief food of the Jabiru. In spite of their unshapely beak, they are able to remove the operculum most admirably, and to draw the mollusc out of its shell. I have found it difficult to procure perfect specimens of that *Ampullaria* for my collections, although shells partly broken or devoid of the operculum covered the low savannahs extensively, while in other parts I found the opercula equally numerous, but no shells.

The Jabiru builds its nest generally on trees, sometimes on rocks. It is constructed of dry branches, lined with a few feathers, in which the female deposits two eggs, which are perfectly white and somewhat larger than a swan's egg. The young ones are gray and not roseate as has been asserted.

When the waters subside after the annual inundations, they frequent in small groups the sandbanks of the river Rupununy in search of crustaceous animals. Nothing can surpass the gravity with which they stalk along; their measured step and upright bearing frequently amused my military companion while on our first expedition in the interior, who was forcibly reminded of the parade, so that he could not refrain while passing the beach from giving these feathered recruits the word of command, and they ever afterwards among ourselves went by the name of his recruits. Before they rise on the wing they prepare for their flight by taking two or three hops, by which they are the better enabled to get on the wing. Their flight is light and graceful; and before they alight, or when rising, they first wheel round the place in gyral motions, either lessening or extending the circles according as it is their intention to do the former or the latter. They soar uncommonly high, and might vie with the eagle. Indeed they appear sometimes as a mere speck in the air.

It is a beautiful sight to see a numerous flock on the wing; all appears confusion when they are first disturbed and rise in the air: they cross each other in the flight, and one would think from below they could not avoid coming in contact; but scarcely have they reached a height of 80 or 100 feet, when order is restored, and they begin flying in circles, rising with each circle higher and higher. When on a more extensive journey, they fly in a horizontal line, and change the leader like the cranes. When feeding on the savannahs, a party is always on the alert while the others seek for their food.

The Macusis call them TARARAMU, the Brazilians JUJU, the Arawaks MORA-COYASEHAA, which signifies spirit of the Mora tree (*Mora excelsa*, Benth.), the Warraus DOIH.

[To be continued.]

Mr. Cuming, some letters from whom, while at Manilla, were given in the 1st vol. of Annals, pp. 57 and 147, we are most happy to state has lately arrived in London; bringing with him, as we understand, very extensive collections of the animals and plants found in the Philippine islands. Of shells, the quantity is large; there are said to be a very great proportion of new species. He has also brought alive, and presented to the Zoological Society, a fine specimen of a new species of Gibbon, a species of *Paradoxurus*, a large Flying Squirrel (*Pteromys nitidus*), the Argus Pheasant, a Fire-backed Pheasant, a Hornbill, &c.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

Sept. 10, 1839.—William Yarrell, Esq., Vice-President, in the Chair.

The following letter, addressed by M. Baillon to Mr. Waterhouse, was read. It is dated Abbeville, July 16, 1839:—

“M. De la Motte has just informed me that when he had the pleasure of seeing you in London you expressed a wish to know the name of a new species of Goose which I described in 1833 in the catalogue of the birds observed in the department of the Somme, and which I have inserted in the ‘Memoirs of the Society of Emulation of Abbeville.’ To this bird I gave the name *Anser brachyrhynchus*, because it appeared to me that one of its most striking characters consisted in the shortness of its beak. This species has been sent by me, under that name, to the museums at Paris, Turin, Mayence,

&c. I have also forwarded two specimens, exhibiting the young and adult states, to M. Temminck for the museum at Leyden, and this learned naturalist stated that he would give an account of the species (under the above-mentioned name) in the fourth volume of his 'Manuel d'Ornithologie.'

"In the same catalogue I described two new species of *Scolopax*, one under the name of *S. La Mottei*, and the other under that of *S. pygmæa*. M. Temminck does not admit that the first is a good species, and for the same reason he will not admit the *Scolopax Brehmii*, which, like my new species, differs only from the *Scolopax gallinago* in the number of tail-feathers. *Sc. Brehmii* has sixteen tail-feathers, whilst *LaMottei* has only twelve; the last-mentioned species differs moreover in being of a much smaller size than the common snipe. The *S. pygmæa* M. Temminck regards as a good species, and he intends to insert it in his work. Like *S. gallinago*, it has fourteen tail-feathers, but it is of a much smaller size than that species; it is even smaller than the *S. gallinula*. Two specimens of this new species, resembling each other, were killed in the same week, and furnished me with the materials of my description.

"A new species of *Anthus* and four new small quadrupeds are also described by me in the catalogue; two of the quadrupeds belong to the genus *Arvicola*, and the remaining two belong to the genus *Vespertilio*."

A paper, by George Gulliver, Esq., F.R.S., Assistant-Surgeon to the Royal Regiment of Horse Guards, entitled "Observations on the Muscular Fibres of the Oesophagus and Heart in some of the Mammalia," was read.

The author mentions the difference of opinion that exists as to the extent to which the muscular fibre of animal life invests the gullet, a discrepancy which has probably arisen from the want of a sufficient number of comparative observations on the lower animals; and states that it has been generally concluded that this fibre is confined to the upper portion of the tube, Professor Müller, Dr. Schwann, and Mr. Skey informing us that the striated muscular fasciculi are either confined to this part of it, or belong only to the muscles of the pharynx, while MM. Ficin and Valentin have been led to assign a much more extensive range to the fibre in question. He then proceeds to give the details of his investigation of this subject, from which he concludes that the muscular fibre of animal life extended much further towards the stomach in certain brutes than in man, but that there was also a remarkable difference in this respect even among different genera of animals.

Sept. 24, 1839.—The Honourable Sir Edward Cust in the Chair.

A letter from E. D. Dickson and H. J. Ross, Esqrs., dated Erzerum, July 18, 1839, was read. It referred to a collection which these gentlemen had forwarded for the Society's Museum. The specimens alluded to in this letter having arrived, were severally brought before the Meeting by Mr. Fraser, and the following notes which accompanied them were read :—

Accipiter fringillarius, Ray. Procured April 3. Male. Found in the stomach small birds. Iris bright orange; margins of eyelids yellowish; bill blue, with black tip; cere yellowish green; legs yellow; claws black. Total length 12·5 inches. Shot near the town.

Falco subbuteo, Linn. Procured May 22. Total length about 12 inches. Bill bluish; legs orange; claws black. The only specimen we have yet seen. Female.

Circus pallidus, Sykes. Procured April 4. Iris bright yellow, with yellow margin to the eyelids; bill bluish; cere greenish yellow; legs orange yellow, with black claws. Total length 17 inches. This year (1839) arrived March 24, and left April 7; last year they arrived March 8 and left May 1. They were then also much more numerous than this year, and most abundant in April.

* *Circus rufus*, Briss. One specimen, a male, procured May 8. Found in the stomach frogs and mice. Shot close to town. Legs pale yellow. A second specimen procured May 24. Found in the stomach a Tern (*Sterna nigra*). Iris bright sulphur-yellow; legs pale dirty yellow. Common about the river: they are shy, but bold.

Hirundo rustica, Linn. Procured April 25. Found in the stomach insects. Iris dark brown; bill and legs black. Total length 8·5. Arrives April 20, and remains here the whole summer; very numerous all over the plain: builds under eaves; the nest is made of mud, straw, and coarse large feathers, neatly lined with fine hay, over which there is a layer of feathers; eggs four, white, speckled with brown.

Lanius Collurio, Linn. One specimen, a male, procured April 20. Found in the stomach Coleopterous insects. A second, a female, procured May 4: found in the stomach worms, &c. Total length 7 inches. A small number seen together in a burying-ground.

Muscicapa grisola, Linn. Found in the stomach insects. Very common in May, in the burying-grounds, and also in fields.

* The species marked with an asterisk have been noticed in the Proceedings as inhabitants of Trebizond, a locality not far distant from Erzerum.—See Proceedings for 1834, pp. 50 and 133; for 1835, p. 90; and for 1837, p. 126.

Muscicapa luctuosa, Temm. Procured April 8. Found in the stomach insects. Shot in a burying-ground. No others have been seen.

Turdus merula, Linn. Procured March 28. Found in the stomach insects. Observed from March 28 to April 7 about burying-grounds, &c. Said to be common in winter both at Tortoom and Trebizond.

Turdus pilaris, Linn. Procured April 1. Found in the stomach beetles. Only one seen; on moist ground.

**Turdus musicus*, Linn. Procured March 28. Found in the stomach Coleopterous insects. Seen from March 23 to April 19: frequents the gardens and ditches near town, and also the roofs of houses. Common. Said to be numerous at Tortoom in February.

Petrocincla saxatilis, Vig. Procured April 19. Found in the stomach insects. Iris brown; bill and legs dusky. Total length 8·5 inches. Found near the river, on moist ground. Another was seen April 22 in a burying-ground near the town.

Sylvia Hippolais, Linn. Found in the stomach small insects. There are two varieties, both of which were sent on a former occasion.

**Curruca cinerea*, Bechst. Procured May 11. Found in the stomach insects. Total length 5·5 inches. Only two seen; one in a ditch, and the other in a burying-ground.

Salicaria phragmitis, Selby. Procured May 11. Found in the stomach insects. Frequent bogs and other moist localities.

Phenicura Tithys, Jard. and Selb. Procured April 17. Found in the stomach small *Coleoptera*. The only specimen found. Bill and legs black.

**Phenicura Suecica*, Jard. and Selb. Procured March. Found in the stomach small insects. Common about rills from March 28 to April 22. Total length 5·7 inches. Subject to several varieties of plumage.

Saxicola rubicola, Bechst. Procured April 19. Found in the stomach small *Coleoptera*. Burying-grounds, and the vicinity of moist ditches. Common. Seen from 19th of April to the present time.

Alda arborea, Linn. Procured April 19. Found in the stomach insects. Shot in a burying-ground adjoining the town: only one seen.

Alda —? Var. Albino, of a species we sent in the first box. No other lark except the *Alda penicillata* has been seen this winter.

Parus cæruleus, Linn. Procured February 17. Bill black, with brownish white margins; legs and claws bluish gray. Total length 4·5 inches. Several noticed in the same places as (*Parus major*,

Linn.) from February 17 to April 7. Some were seen at Tortoom in February.

**Parus major*, Linn. Procured March 25. Bill black, with dark margins; legs and claws bluish gray. Total length, 5·5 inches. Among trees and rose-bushes in town. Noticed from January 31 to March 2.

**Emberiza Cia*, Linn. Procured April 4. Found in the stomach very small graminaceous seeds. Total length 6·8 inches. Bill bluish; legs light brown. Observed from 3rd to 25th of April, near mill-streams and in burying-grounds. Common.

Emberiza citrinella, Linn. Procured March 24. Food the same as that of *Emberiza Cia*. Common upon trees and in burying-grounds. Seen from March 23 to April 23. Total length 7 inches.

Emberiza hortulana, Linn. Procured April 19. Found in the stomach insects and small seeds. Total length 6·3 inches. Bill light brown; legs very pale light brown. Frequents the vicinity of mill-streams. Noticed from April 19 to May 8. It is singular, that among fourteen or fifteen birds which we examined, shot at different times and places, every one had insects as well as seeds in the crop and gizzard. The female has the feathers of the breast, summit of the head, nape, and sides of the chin, marked with longitudinal dusky spots.

Coccothraustes chloris, Flem.

Coccothraustes vulgaris, Briss. Procured April 10. Found in the stomach seeds, both large and small. On a tree in town. Only two seen.

Fringilla montifringilla, Linn. Procured March 31. Bill yellowish, and black at the tip; legs dusky. No others have been seen.

Fringilla Cælebs, Linn. Procured March 26 and 27. Found in the stomach small seeds. Common in the vicinity of rills. Total length 6·3 inches. Bill light brown, or of a smoke-blue colour; legs dark brown. Arrived March 26, departed April 17.

Pyrrhula —? Procured Feb. 27. Found in the stomach seeds. Total length 5·7 inches. Shot on some willows at Tortoom, where they are said to be common.

**Sturnus vulgaris*, Linn. Procured March 8. Total length 9·6 inches. Very common. Frequents the habitations of man, and feeds in fields, &c.; these birds are also the constant attendants of cattle while grazing: at sunset they return in large flocks, to roost upon trees and eaves of houses. Arrive in the beginning of March and disappear late in November. Turkish name, *Sighergih* (diminutive of ox).

Garrulus melanocephalus, Bonelli. Procured February 27. Bill black; legs light brown. Shot at Tortoom, thirty miles from Erzeroum, having a much milder climate than this. Shy.

Pica caudata, Ray. Procured February. Found in the stomach carrion, insects, &c. A few live in and about town: roost and build on trees: none are found at Trebizond.

* *Corvus monedula*, Linn. Found in the stomach carrion, offal, &c. Very common. Frequents town and the vicinity of man; often seen in fields, and is very familiar: in winter is only seen about the town: towards sunset these birds assemble in large flocks to roost upon the trees about the town: begin to pair early in April, and build in the end of the same month, low down in chimneys.

Corvus frugilegus, Linn. Killed March 24. Begins to arrive about the end of January. Common. Frequents fields, &c., and is often seen following the plough: towards sunset these birds assemble into small flocks, and return to town to roost upon trees, on which they build.

Corvus Cornix, Linn. Procured January 13. Found in the stomach grain, hair, bones, offal, &c. Arrives January 1 and leaves March 28. Common about the streams near town; when approached it sometimes erects the feathers on the crown of the head: it is by no means shy. Only seen on clear sunny days.

Cuculus canorus, Linn. Procured April 22 and 30. Found in the stomach insects. Iris yellow; margin of eyelids bright sulphur-yellow; tip of the bill and greater part of the middle black, remainder greenish; margins of the gape and the root of the lower mandible yellow; legs bright yellow: the plumage of both sexes alike. Noticed from April 22 to May 17. Frequents burying-grounds, fields, and the adjoining hills. Not numerous.

Yunx torquilla, Linn. Procured May 4. Found in the stomach very small brown ants. Shot on a tombstone. Solitary. Total length 7 inches.

Upupa Epops, Linn. Noticed from April 21 to September 17. Most common during summer.

*Columba *Ænas**, Linn. Food seeds. Common.

Perdix saxatilis, Meyer. Numerous at Tortoom. Sometimes found here in the depth of winter, in burying-grounds and in the ditches round the town: in summer it is said these birds inhabit the neighbouring mountains.

Glareola limbata, Rüpp. Procured May 5. Found in the stomach small crickets. Total length 11 inches. Bill black, the margins of the gape being red; legs dusky, with black claws. Only seen

in May, when these birds were common in small flocks about the moist turf near the river. Shy.

Nycticorax Europæus, Steph. Procured March 29. Shot at the river, perched on a tree. Total length 24 inches. Iris bright scarlet.

Gallinula chloropus, Lath. Procured April 14. Found in the stomach very small black seeds. Anterior half of the bill yellow, with a greenish tinge; the remainder, as also the plate on the forehead, bright red, inclining to scarlet; iris bright red, with two very narrow rings round the pupil, the inner one being dark yellow and the outer one black; legs yellowish green, with a patch of bright orange red above the knee-joint. Fell with a few others into the yard of a house, where it was caught alive.

Totanus hypoleucos, Temm. Procured April 6 in a burying-ground, near a pool of water. Another shot on the 19th, near a mill-stream.

**Scolopax major*, Gmel. Procured April 19. Total length 11·5 inches. Common in boggy grounds.

Charadrius minor, Meyer. Procured in March. Found in the stomach insects. Only three seen.

Platalea leucorodia, Linn. Procured May 24. Found in the stomach grass and feathers. Seen at the river, where it breeds: several nests are placed near each other, about the middle of the river. They are made of reeds, bound together by weeds, which are piled up a few inches above the water's edge. Over this foundation dried reeds are placed in various directions, to form the body of the nest, which is not lined with anything, and is just large enough to allow one bird to sit, and the other to stand beside it: we found four eggs in each; they are white, spotted with brown. Turkish name, *Cashik Booroonoo* (Spoon-bill), and *Taktar Boornoo* (Broad-bill).

Zapornia pusilla, Steph. Procured April 19. Bill green, with the margins of the gape red. Boggy ground near the river. Another shot May 5.

**Anas Boschas*, Linn. Procured May 12. Very common at the river: breeds here. The ducklings seen on the 1st of August 1838; these birds arrived on the 5th of April. Early in spring a few were seen in the fields near town; they afterwards feed in wet fields near the river.

Dafila caudacuta, Leach. Procured April 1. Found in the stomach small seeds. Shot in a brook near the river. Total length 26 inches. Upper mandible bluish, with slate-coloured sides near its base, and black culmen; under mandible brownish black; legs slaty colour, with the webs and claws dusky.

Chaulelasmus strepera, G. R. Gray. *Chauliodes strepera*, Sw. Procured March 28. Found in the stomach sand. In a wet field near mill-streams, close to town. Iris hazel. Drake, total length $19\frac{5}{8}$ inches. Maxilla black; mandibula dark brown; legs yellow, with very dark brown webs and claws. Duck, total length $18\frac{5}{8}$ inches. Bill yellow, with a very dark brown ridge along the middle of the maxilla; legs like those of the drake.

Rhynchapsis clypeata, Steph. Procured April 21. Crop filled with worms, caterpillars, and a number of eggs of some insect or fish; gizzard contained small seeds and gravel. Total length 18·5 inches. Feet orange, with dusky webs and claws; maxilla of a dusky greenish tinge; mandibula dirty orange brown. A few of these birds seen together at the marsh.

**Querquedula circia*, Steph. Procured April 15. Total length 15·5 inches. Iris hazel; bill dusky; legs dusky gray; claws and webs dusky. A couple seen in a wet field near town.

**Podiceps cristatus*, Lath. Procured May 24. Found in the stomach grass, fish, and feathers. Iris bright cochineal colour, with a narrow yellow ring round the margin of the pupil; bill greyish dusky; legs outside dusky, inside yellowish gray, marked with patches of dusky. The bill in some (especially the males) has a good deal of red. The plumage of both sexes is alike. Frequents the river.

Podiceps rubricollis, Lath. Procured May 24. Found in the stomach grass. At the river.

Podiceps auritus, Lath. Procured June 2. Found in the stomach grass, with a few insects. Iris of a very bright golden scarlet; margin of the eyelids orange; bill black; legs dusky outside, grayish inside. Inhabits the river.

Larus argentatus? Brunn. Procured April 12. Found in the stomach hair, clots of blood, chick peas, and a portion of a sheep's hoof. Iris hazel; margin of eyelids bright orange red; bill orange, marked with red, dusky near its tips, which have a horny appearance; legs yellowish orange, the claws dusky. Arrives March 23. At first frequents rills, at a short distance from the town, but after the melting of the snow these birds are found at the river. They are shy, and fly high.

**Larus ridibundus*, Linn. Procured April 20. Found in the stomach water-beetles. Iris hazel; bill of a deep lake-colour, with the tip inclining to dusky; margins of the eyelids bright red; legs same colour as bill; the claws dusky. Total length 14·5 inches. These birds are very common about the river, where they breed,

on small strips of land, just appearing above water, and surrounded by sedges: the nests are placed in a row, mingled with those of other birds, and are constructed of reeds externally, and weeds inside; each nest is three or four inches high, and contained on the first of June one egg, of an olive-green colour, spotted irregularly with chocolate, brown, and purple patches.

Sterna nigra, Linn. Procured May 24. Found in the stomach beetles. Iris very dark brown, almost approaching to black. Common at the river, where these birds are seen in small companies.

**Sterna Hirundo*, Linn. Procured May 24. Found in the stomach fish. Iris hazel. Frequents the river: common. Breeds on the slips of land that are laid bare by the diminishing of the waters at the river: it makes no nest, but lays its eggs on the ground.

On the Crania and Dentition of Carnivora, by Mr. Waterhouse: (see p. 25 of this volume.)

BOTANICAL SOCIETY OF LONDON.

November 15.—John Reynolds, Esq., Treasurer, in the Chair.

Donations of British plants were announced from several members. Mr. Daniel Cooper called the attention of the meeting to several varieties of British plants which he had selected from the several parcels sent in for distribution.

Mr. T. G. R. Rylands communicated notes on "*Aspidium lobatum*, var. β . *Lonchitidoides*." Mr. R. having long doubted the permanency of this "variety," but having had but few satisfactory opportunities of judging, came to no decision on the subject. On the 11th of March, 1839, he met with a plant which he considers goes far to prove that it is but casual, since from one root he gathered fronds belonging to both α and β , and of almost all the grades between; the following may serve as characters of four of the fronds, specimens of which were exhibited.

1. Fronds distinctly bipinnate (var. α). 2. Frond sub-bipinnate, upper and lower primary pinnules distinct and auricled, pinnæ more or less pinnatifid. 3. Frond sub-bipinnate, *upper* primary pinnules *only* distinct, pinnæ inciso-serrate. 4. Fronds almost simply pinnate, only one or two of the upper primary pinnules distinct and scarcely auricled, and those at the bottom of the frond (var. β). No. 1 Mr. R. considers in all respects *lobatum verum*, and No. 4 is as far from it as he has ever seen one. He has since had the plant in cultivation, and though small (owing to the confinement of the

roots) will, he thinks, produce fronds of both varieties this season. A singular monstrous variety of *Juncus*, found in Faversham, Kent, by Mr. Cowell, was exhibited. Specimens of *Rhinanthus major* from near Hastings, Sussex, were exhibited by Mr. Ranking, who discovered them in that locality. A small slender-stemmed and purple-flowered variety of *Euphrasia officinalis*, (probably a new species,) discovered by the Rev. A. Bloxam, in Seamor Moor, near Scarborough, in 1838, was likewise exhibited. Mr. Daniel Cooper noticed a rare variety of *Bartsia Odontites*, found by him near Papplewick, Nottinghamshire, in September 1839, and described only in the seventh edition of Withering's British Flora, vol. iii. p. 727, and noticed thus—“*Bartsia Odontites*, var. 2. Flowers white, stem very pale green, leaves without any tinge of red.” The two following localities are there quoted, “Gathered by Rev. — Bourne, on Northington Farm, Grimley, near Worcester.” (Mr. Woodward also found this variety growing near Diss, in Norfolk.—*Ed.*) From this it would appear that the variety under consideration is by no means of common occurrence. The following is the additional station as given by Mr. Cooper: “At the south-east corner of a small wood called Jack-o-Sherwood, about half a mile from Papplewick, Nottinghamshire, in a marshy plot of ground, on the border of the small river,” fully exposed to the rays of the sun. From the decided different character and appearance of this variety of so common a British species, Mr. Cooper is inclined to consider it deserving a place in the recent British Floras. In the recently published Flora of the county, Dr. Howitt does not mention it, neither is it to be found recorded in the recently published British Floras, with the exception of that of Dr. Withering above-quoted.

November 29.—Anniversary Meeting. J. E. Gray, Esq., F.R.S.
President, in the Chair.

The Secretary read the Third Annual Report, from which it appeared that donations of British plants had been received from the Botanical Society of Edinburgh and forty-eight members. The number of British specimens received amounted to 101 natural orders, 491 genera, 1291 species, including 24,860 specimens, being an increase in that of last year of 3 natural orders, 69 genera, 241 species, and 6268 specimens. As the British Phænogamous collection is daily becoming more complete, and as the Council anticipate shortly to have a perfect collection, the attention of the members is particularly solicited to the genera *Rubus*, *Rosa*, and *Salix*, as they are anxious to complete those genera and render them of service to

botanists for reference. The Society is much indebted to Mrs. Riley of Papplewick, Notts, for a complete collection of British Ferns, comprising all the genera, species, and varieties; to the Rev. W. T. Bree, for specimens of *Aspidium rigidum*, from the original station at Ingleborough, Yorkshire; and to Mr. J. Tatham, jun., of Settle, Yorkshire, for numerous specimens of the same species, collected by him on the hills in that vicinity. To the kindness of the Rev. A. Bloxam, the Society is indebted for specimens of a plant new to the British Flora, viz. *Myriophyllum alterniflorum*, discovered by him at Twycross, Leicestershire, in June 1839; and to Dr. Macreight, V.P., for additional specimens of *Spartina alterniflora*. The Council being desirous of forming an Herbarium of British Cryptogamic Plants, called the attention of the members to collecting the several tribes. Donations of nearly 6000 Foreign Plants were announced.—March 25, 1840.

ROYAL IRISH ACADEMY.

A paper was read by Jonathan Osborne, M.D., on Aristotle's History of Animals.

Dr. Osborne commenced by observing, that this work was composed under circumstances more favourable to the acquisition of natural knowledge than any work on the subject ever published. According to Pliny, some thousands of men were placed at the disposal of the author, throughout Greece and Asia,—comprising persons connected with hunting and fishing, or who had the care of cattle, fish ponds or apiaries,—in order that he might obtain information from all these quarters, *ne quid usquam gentium ignoraretur ab eo*: and according to Athenæus, the same prince gave him, on account of the expenses incurred in composing it, 800 talents,—a sum, which, taken at the lowest, that is, the lesser Attic talent, amounts to above 79,000*l*. The work, composed under such auspices, is such as might have been expected. The extent of the observations is prodigious; and we cannot read far in any part of it, without being constrained to exclaim with Cicero, *Quis omnium doctior, quis acutior, quis in rebus vel inveniendis vel judicandis acrior Aristotele?*

Shortly after the introduction of Greek literature to Europe, and when this book was first printed, those sciences which have nature for their object were in the lowest condition. There was at that time no taste diffused for the study of zoology or comparative anatomy; and at later periods, when the value of these studies came to be better appreciated, the Aristotelian philosophy had fallen into

disuse. Thus this work has, from this combination of circumstances, been passed over; is seldom quoted except at second-hand; and no edition of it distinct from the other works of the author, or illustrated as the subject required, has appeared since that of Scaliger, published in 1619,—except one, accompanied by a French translation by Camus, in 1782, which is said to be incorrect, and is become scarce.

Dr. Osborne proceeded to make a short analysis of the contents of this work, and showed that Aristotle had anticipated Dr. Jenner's researches respecting the cuckoo, as also some discoveries with respect to the incubated egg, which have been published within the last year. His observations on fish and cetaceous animals are curious in the extreme, as might be expected from the variety of these animals abounding in the Grecian seas. Those on insects it is difficult to appreciate, from uncertainty as to the names. He describes the economy of bees, as we have it at present; but mistakes the sex of the queen. He holds the doctrine of spontaneous generation in those cases in which he could not detect the ovary; an inevitable conclusion arising from the want of the microscope, to which, and the want of knowledge of pneumatic chemistry, his principal errors are to be referred. The various organs are described as modified throughout the different classes of animals (beginning with man, the *Βουλευτικόν μόνον*), in nearly the same order as that afterwards adopted by Cuvier.

As specimens of the interesting matter treated of in the work, Dr. Osborne selected the animal nature of sponges; the ages of various animals; the movements of the nautilus; (the same doubt existing in the author's mind as to the origin of the shell, which has divided the opinions of Messrs. Blainville, Owen, Gray, and Mad. Power, within the last year;) the localities of animals, as affording data for ascertaining the rate at which they have extended themselves over the globe; particulars relating to artificial incubation as practised in Egypt; the management of cattle; a mode of fattening hogs with rapidity, by commencing with a fast of three days; the mohair goat located in Cilicia, as at present; hybernation and migrations of various animals and fish; description of the fisher-fish (*Lophius piscatorius*) and of the torpedo, with the proof that they catch their prey in the extraordinary manner described; many ingenious modes of taking the partridge, and of fishing detailed; the friendships which have been perpetuated between different classes of animals,—as the trochilus and the crocodile, the *Pinna muricata* and the *Cancer pinnotheres*, the crow and the heron; their animosities,

as between the crow and owl ; the diseases of animals traced throughout the series, extending even to fish ; hydrophobia described as being communicated by the bite of the rabid dog to all animals except man, which appears to be the correct statement with respect to hot climates, and not (as has been represented by some modern travellers) an entire absence of the disease.

These detached specimens of the contents of this work furnish, however, a very inadequate idea of its real value. There are in it whole sections, the separate sentences of which would furnish texts for as many Bridgewater Treatises. The freshness and originality of the observations, taken from nature herself, and not made up from quotations of preceding writers ; the extent of the views, not bounded by any necessity for complying with preconceived or prevalent notions, but capacious as the author's mind itself, and frequently leading the reader into the most interesting under-currents of thought branching off from the great fountain ; these are all merits belonging to the work, but not constituting its chief value,—which is, that it is a collection of facts, observed under peculiar advantages, such as have never since occurred, and *that it is at the present day to be consulted for new discoveries.*

Now that Greece is, for the first time since the revival of letters, in possession of a government capable of appreciating scientific investigations, a favourable opportunity offers for preparing an edition of the work, at once worthy of the age in which it was composed, and of that in which we live ; and perhaps some individual may be found, possessing a competent knowledge of the Greek language, and of zoology and comparative anatomy, who, after a sufficient examination of the animals now in Greece, shall undertake the task of editing and illustrating this great work. Such a performance, properly executed, would be the resuscitation of a body of knowledge which has lain buried for above 2000 years ; and would certainly be no less acceptable to zoologists and anatomists than to the cultivators of classical learning.

ORKNEY NATURAL HISTORY SOCIETY.

We are glad to see, by the Second Report, which has just reached us, that this Society is proceeding vigorously and successfully in the promotion of those objects for which it was instituted (see page 137 of our present volume), and that several of the more influential gentlemen who are connected with those northern regions have given it their support. We feel confident that it cannot but succeed in

greatly promoting the advancement in civilization of the inhabitants of those islands to which its energies are more peculiarly applied. We are informed by the Secretary, the Rev. W. Stobbs, that specimens illustrative of natural history from the southern parts of the kingdom will be peculiarly acceptable to the Society, and as we feel confident that many of our readers will have much pleasure in advancing this promising institution, we think that we cannot do better than refer them to the Secretary, whose residence is at Stromness, Orkney.

MISCELLANEOUS.

PRIZE QUESTION.

To the Editors of the Annals of Natural History.

GENTLEMEN,—Having met with the following announcement in the ‘*Repertorium der gesammten Deutschen Literatur*,’ No. XVII. September Heft, 1840, and thinking it might be interesting to some of your readers, I have transmitted it for publication in the *Annals*.

“The Royal Academy of Berlin wishes that experiments be instituted for the purpose of ascertaining, if only in one plant, in what the physical and chemical effects of the mineral constituents and salts which plants derive from the earth during the process of development consist. The inquiry to be conducted with a special regard both to the substances formed by the decaying parts of the plant and to those excreted by the roots; the object of the whole being to elucidate the question of the conversion of the constituents of the soil, as clay, gypsum, &c., into the structure of the plant.” A prize of 300 Thalers (45*l.*) will be awarded to the best paper on this subject which may be written in the German, French, or Latin languages, and must be sent in before the 31st of March 1841. The awarding of the prize to be made in July. Each paper must be accompanied by a motto upon a sealed envelope bearing the writer’s name.

I am, Gentlemen, your obedient Servant,

EDWIN LANKESTER, M.D.

Campsall, Feb. 27, 1840.

BOTTLE-NOSED WHALE.

The following detailed account of one of the *Hyperoodons* noticed in the *Annals* for February last, has been communicated to me by Mr. Henry Johnson, Royal Institution, Liverpool.—WM. THOMPSON.

Belfast, May 4, 1840.

“I beg leave to say that, in your paper published in the *Annals Ann. Nat. Hist.* Vol. 5. No. 32. July 1840. 2 c

of Nat. Hist. for February last, p. 379, you are right in supposing it to have been the Bottle-nosed Whale that was taken near Liverpool. It was exhibited on the Cheshire coast, opposite Liverpool: I went and saw it. It measured 25 feet long and 13 feet in girth; from the point of the nose to the pectoral fin 6 feet, pectoral fin 2 feet 5 inches, from the point of the nose to the eye 3 feet 9 inches. From the origin of the dorsal fin to the end of the tail 9 feet; width of tail 6 feet, dorsal fin 20 inches; from the eye to the gape 21 inches. It was caught at East Hoylake in four feet water, and when first seen was throwing the water from the blow-hole two roods high. The fishermen attempted to stick grappling irons into its sides, but they slid off; and when its assailants were about to give up the chase, (by this time the tide was making fast, and the whale was exerting itself to get away,) one of the prongs of the grappling irons slid along, and by chance caught in the blow-hole, after which it blew no more water and died almost instantly without a struggle. After being shown opposite Liverpool for a few days, it was taken back to Hoylake, cut up, and boiled for oil. Its stomach contained an immense quantity of cuttle-fish beaks, in fact there was nothing else in it. There were two teeth in the lower jaw, very conical in form, and very sharp-pointed. The part which was above the socket resembles a cock's spur, but the lower half is suddenly swelled out and hollow. They measure 1 inch 8 lines in length; no part of them was observable above the gum, and it was not till I cut for them that I saw them. The bones were purchased by the Committee of the Royal Institution, and I intend having them put up this summer.—HENRY JOHNSON, Royal Institution.

Liverpool, April 25, 1840."

REMARKABLE CHANGE OF HABIT IN THE HARE.

MY DEAR LORD,—I send you the story of the Hares I told at Florence-court; Major Bingham is the proprietor alluded to, and my father related the story in a Lecture for the Zoological Society 'On the Instinct of Animals.'

Most truly yours,

To the Earl of Enniskillen.

S. G. OTWAY.

April 22, 1840.

"A considerable landed proprietor has a large tract of sand hills within the Mullet, which tract (open as it is to all the Atlantic storms) has been found to have been greatly impaired by the introduction of rabbits, who by their burrowing and disturbing the bent

grass gave facilities to the wind to operate, and so the sand hills were, year after year, changing their position, encroaching on the cultivated ground. To remedy this, he determined to destroy the rabbits, and in their place introduced hares, which he knew, or thought he knew, would not burrow : but here he was mistaken ; for the animal soon found that it must leave the district or change its habit ; for if on a winter night it attempted to sit in its accustomed form, it would find itself buried perhaps twenty feet in the morning under the blowing sand, as under a snow rath. Accordingly the Hares have burrowed ; they chase out a thin and high sand hill, which stands somewhat like a solidified wave of the sea. Through this Puss perforates a horizontal hole from east to west, with a double opening ; and seating herself at the mouth of the windward orifice, she there awaits the storm ; and as fast as her hill wastes away, she draws back, ready at all times to make a start in case the storm rise so as to carry off the hill altogether."

NOTE ON ANIMALCULES. BY E. FORBES, ESQ.

Two vessels of sea-water, the one containing a sea urchin, the other a portion of *Spongia papillosa*, were suffered to remain unchanged until the animals died. That containing the *Echinus* was placed in a dark place, that containing the sponge in a window exposed to the sunlight. In about ten days' time the latter became of a beautiful green colour, while the former remained transparent though a thick scum gathered on the surface. The water of each was then submitted to the microscope, and both were found to abound in animalcules. The green colour of the sponge water was found to be derived from innumerable animals of the genus *Volvox*, among which were seen minute worm-like animalcules and other smaller forms. The urchin water contained no *Volvox*, but abounded in large *Polygastrica* which darted about with great rapidity.

Wishing to examine the structure of these creatures, I adopted the following plan, which seems to me much superior to the usual method ; namely, isolating one specimen to a drop of the sea-water containing the animalcules, I added an equal quantity of fresh water. The effect was instantaneous ; the rapid motions of the little creatures were suddenly arrested ; they were paralysed, but not killed, and their internal structure was beautifully displayed. They were as voracious as ever, for on mixing some carmine with the water, in half an hour's time their (so-called) stomachs were coloured with the pigment they had devoured. It was a very curious sight

to see a herd of *Polygastrica* eating up the carmine, poking about the colouring matter with their pouted-out mouths like so many pigs.

In the vessel containing the *Volvox* there grew up some fuci of a green colour, which attained a length of an inch and a half in a few days. They sprung from the side of the vessel furthest from the light, while the *Volvox* congregated to the side nearest the light.

Whatever I have seen of the structure of the *Polygastrica* would lead me to adopt the views of M. Dujardin and Professor Rymer Jones in preference to those of Professor Ehrenberg.—EDWARD FORBES, May, 1840.

NOTES ON IRISH BIRDS.

GREAT SPOTTED WOODPECKER. *Picus major*, Linn.—On November 13, 1839, one of these birds (which are of very rare occurrence in Ireland) was shot at Castlereagh, near Belfast, by Mr. Greenfield, who remarks that it was “very tame,” and when fired at was engaged in pecking into a dead tree; it seemed to be unaccompanied by any of its species. It is a male bird, but not in adult plumage; and has been presented by the gentleman just named to the Belfast Museum.

AVOCET. *Recurvirostra Avocetta*, Linn.—The only allusion to the occurrence of this bird in Ireland that I am aware of is in Ruttý's Natural History of the County of Dublin, in which work a specimen shot in Dublin Bay is particularly noticed. B. S. Ball, Esq., late of Youghal, informed me some time since, when looking over continental specimens of this bird along with him, that many years ago he shot an individual of the same species near that town.

SABINE'S SNIPE. *Scolopax Sabini*, Vigors.—About March 13, 1838, one of these rare birds was shot near Kinnegad, Westmeath, and at once brought to Dublin*. In the ensuing month of May I saw the specimen in the possession of Mr. Glennon, the well-known bird, &c. preserver in that city. Its measurements were

	inch.	lin.
Length (total)	11	3
— of bill above.....	2	7
— of tarsus	1	3½
— of middle toe and nail.....	1	4
— of wing from carpus	5	3

In plumage it was quite similar to the individuals hitherto described. Mr. W. S. Wall, a Dublin bird-preserver, who saw this specimen, then assured me that about nine years before a similar bird was, on

* It was noticed by Dr. Gilgeous before the Natural History of Dublin on the 20th of April.

account of its remarkable appearance, sent him to be preserved by the Rev. Sir Harcourt Lees, Bart., under the name of "black snipe." It was shot in this country and quite fresh when received by Wall. When set up it was presented by Sir H. Lees to the Museum of the Royal Dublin Society, but within a few years was attacked by moths and destroyed. With reference to the species of the bird in question, I have every reliance on the discrimination of my informant.

EIDER DUCK. *Somateria mollissima*, Leach.—A few specimens of this bird purchased in different years in the Dublin market have been preserved by Mr. Glennon, and one individual has in a recent state been seen here by R. Ball, Esq., but I have been unable to ascertain with certainty whether they were obtained on the Irish coast, although in all probability they were so. The following note, which is satisfactory on this point, was kindly communicated to me by Dr. Farran of Dublin, on May 25, 1840 :—"On Saturday last I received a fine specimen of the male Eider alive from Mr. John King, Bre-more, Balbriggan; he saw it struggling to get up the rocks, and, attracted by its size and unusual plumage, got a boat and secured it: a severe injury which it had received in one of the thighs most likely prevented its rising."—W. THOMPSON, Belfast, June 1840.

NEW SPECIES OF *AGRILUS*.

The Rev. William Little has during the last summer (1839), among several other rare insects, discovered a species of *Agrilus* which appeared undescribed; and upon being submitted to the examination of Mr. Shuckard for the use of his work on the British Coleoptera, that entomologist considered it entirely new to science, and dedicated it to its discoverer. This insect was found in the vicinity of Rae Hills in Annandale, Dumfries-shire, during the month of June, on a willow (*S. auriculata* ?), confined to a locality not exceeding six yards in extent; about twenty specimens were captured.

The following are the characters and description from p. 244 of Shuckard's 'Elements of British Entomology.'

AGRILUS LITTLEI, Shuck.

Granuloso-punctatus, capite thorace et corpore subtus cupreis; elytris viridibus. Length 4 lines.

Rather finely granulated; head, thorax, the underside of the body, antennæ, and legs of a coppery-red. Thorax undulated posteriorly, having a deep sinus opposite the centre of each elytron, another central one opposite the scutellum, and a deep central fossulet in front of the latter; the sides slightly rounded, depressed and margined, and with a small abbreviated carina just within each of its posterior angles.

Elytra of a brilliant golden green, as wide as the thorax in front, and slightly attenuated at the apex, where each is rounded and the edge furnished with minute denticulations.

I have dedicated this species to the Rev. W. Little, as a small testimonial of the extensive services he has rendered to British Entomology in exploring its productions in the northern parts of the island.

Mr. Stephens, upon the faith of a casual glimpse of this insect, says in the Appendix to his 'Manual,' that this species greatly resembles the *A. mendax* of Dejean, described by Mannerheim, 'Bullet. des Natural. de Moscou,' 1837, No. viii. p. 111; by a comparison of the two descriptions, it will however be found that two insects, in the same genus, could not well differ more, their only points of resemblance being the small carinæ at the base of the thorax. The *A. mendax* is also one and a half line longer, a great difference in small insects.

ON MR. GRAY'S EDITION OF TURTON'S MANUAL.

Notice respecting the new edition of 'Turton's Manual of the Land and Fresh-water Shells of the British Islands, thoroughly revised and much enlarged, by John Edward Gray, Esq., F.R.S. &c.' By the Rev. William Hincks, F.L.S.

Though far from being all that might be desired, Dr. Turton's Manual has been found a convenient and useful book by those interested in the study of the British land and fresh-water molluscan animals; and though some may wish that Mr. Gray had rather been induced to publish an original work on the subject, his improvements in this edition give it a greatly increased value, and will be gratefully received by the lovers of this pleasing and generally accessible branch of Natural History.

But there is one part of Mr. Gray's plan, which he deserves our thanks for introducing at all, which he was obliged to execute, as he himself informs us, from such very imperfect materials, that the benefit we derive from what he has attempted will consist rather in the quantity of information that he will cause to be collected, than in any great reliance that can be placed on what he has now given. I refer to that part of his introduction which relates to the geographical distribution of the land and fresh-water mollusca in Great Britain. His materials are no doubt good as proofs of the presence of certain species in certain districts, but they are too imperfect to allow of any safe negative conclusions.

From no disposition to depreciate his admirable work, but for the assistance of those who use it, I here note down a few facts which have fallen under my own notice in contradiction to his statements,

but justifying his own remark,—“It is probable that many of the species here indicated may have a much more extended range.”

Species, according to Mr. Gray's Table, confined to the southern half of the kingdom, all of which I have found at York, during my residence there :—

Paludina vivipara.

———— *achatina*, near Doncaster.

Bithinia ventricosa.

Neretina fluviatilis. Dorsetshire is mentioned, on Montagu's authority, as the western limit of this shell, but I have taken it in the river Exe, and known it to be found in the south of Ireland.

Planorbis corneus.

Cyclas rivicola, mentioned as almost confined to the Thames, but I have taken it abundantly at York, and I have it also from Lancashire.

Unio tumidus, near York.

Species enumerated as being only observed in the north, but also found to my knowledge in the south :—

Helix lamellata, abundant near Cork.

Zonites purus, near Cork.

———— *excavatus*, near Cork.

METEOROLOGICAL OBSERVATIONS FOR MAY, 1840.

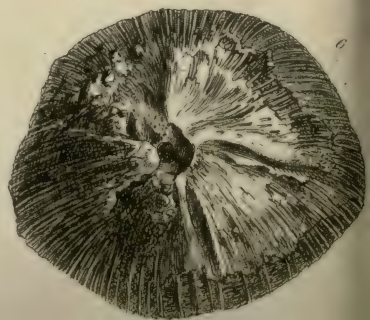
Chiswick.—May 1. Slight haze : fine. 2—4. Hot and dry with easterly wind. 5. Overcast. 6, 7. Slight haze. 8. Heavy showers : fine. 9. Rain with sultry intervals. 10. Cloudy : sultry. 11. Drizzly. 12. Overcast. 13. Rain : sultry. 14. Cloudy and fine. 15. Heavy rain with thunder. 16. Cloudy : showery : hail shower at 12½ P.M. 17. Rain. 18. Cloudy and fine : rain. 19, 20. Cloudy and cold. 21. Clear and cold. 22. Overcast. 23. Clear and fine. 24. Overcast : rain. 25. Cloudy. 26. Rain. 27—30. Very fine. 31. Hot and dry : cloudless.

Boston.—May 1. Cloudy. 2—4. Fine. 5, 6. Cloudy. 7, 8. Cloudy : rain early A.M. : rain P.M. 9. Rain : rain early A.M. 10. Cloudy : rain early A.M. 11. Rain : rain early A.M. 12. Cloudy : rain early A.M. 13. Rain. 14. Cloudy : rain with thunder and lightning P.M. 15. Rain. 16, 17. Cloudy : rain A.M. and P.M. 18, 19. Cloudy. 20. Cloudy : rain P.M. 21, 22. Stormy. 23, 24. Cloudy. 25. Stormy : rain A.M. 26. Rain : rain A.M. 27. Cloudy. 28. Fine. 29. Stormy. 30, 31. Fine.

Applegarth Manse, Dumfries-shire.—May 1, 2. Beautiful day. 3. The same : Thermometer in shade 75°. 4. Very dry and warm till P.M. 5. Very droughty. 6. The same increased : cloudy. 7. Slight showers all day. 8. The same A.M. : cleared up. 9. Slight showers early A.M. 10. The same : thunder P.M. 11. Rain heavier. 12. Rain nearly all day. 13. Fair. 14. Showery P.M. : thunder. 15. Occasional showers : thunder. 16. Rain preceding night : clear day. 17. Rain in the night : fair. 18. Fresh and cool. 19. Dry and rather boisterous. 20. Dry and more moderate. 21. Very droughty : clear sky. 22. Calm and warm. 23. Showery : high wind. 24. Showery. 25. Showery, and very high wind. 26. Fresh and showery. 27. Fine A.M. : wet P.M. 28. Very wet till P.M. 29, 30. Fine growing day. 31. Variable : bright at midday : wet evening.

Days of Month. 1840. May.	Barometer.				Thermometer.				Wind.				Rain.			Dew point. Lond.: Roy. Soc. 9 a.m.	
	London : Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire.		London : Roy. Soc. 9 a.m.	Self-register. Fahr. 9 a.m.	London : Roy. Soc. 9 a.m.		Chiswick.	Dumfries-shire.	Boston.	Dumfries-shire.			
		Max.	Min.		Max.	Min.			Max.	Min.					Max.		Min.
1.	30-356	30-343	30-325	29-80	30-25	30-23	48-7	48-2	67	43	49-0	71	45½	...	...	50
2.	30-288	30-290	30-194	29-82	30-21	30-14	55-4	45-2	74	42	53	72	43	...	...	52
3.	30-172	30-161	30-109	29-72	30-14	30-10	59-3	46-3	74	43	55	75	44	...	...	49
4.	30-105	30-105	29-994	29-68	30-05	30-00	58-3	48-7	70	41	58-5	73	49½	...	...	49
5.	29-912	29-924	29-868	29-40	29-96	29-90	55-7	45-4	66	46	52	62	45	...	...	49
6.	29-888	29-903	29-800	29-36	29-87	29-83	54-7	49-0	68	49	50	52	40½	...	0-18	51	
7.	29-760	29-761	29-702	29-27	29-70	29-64	57-3	49-7	68	50	51	46½	42½	...	...	51
8.	29-706	29-698	29-646	29-07	29-57	29-53	59-7	54-7	70	51	55	50½	41½	...	...	54
9.	29-524	29-525	29-425	29-07	29-50	29-53	55-0	54-0	71	51	55	50	42½	...	...	53
10.	29-402	29-474	29-392	28-86	29-55	29-57	59-8	53-3	72	50	52	51	38	...	...	58
11.	29-534	29-644	29-533	28-95	29-60	29-67	52-8	51-6	55	50	49	54½	39	...	...	53
12.	29-670	29-694	29-657	29-14	29-65	29-68	53-7	51-2	62	48	51-5	50	40	...	...	52
13.	29-662	29-702	29-654	29-21	29-65	29-58	53-3	49-8	67	49	53	56	43	...	...	52
14.	29-678	29-682	29-562	29-09	29-50	29-40	59-3	51-9	66	50	55	63½	44	...	...	55
15.	29-414	29-442	29-404	28-79	29-29	29-23	53-7	53-2	60	49	53-5	64	48½	...	...	55
16.	29-404	29-413	29-379	28-73	29-14	29-16	57-8	51-4	65	47	56	58½	48	...	...	52
17.	29-374	29-469	29-387	28-76	29-24	29-38	55-7	50-2	62	46	55	53½	45½	...	...	52
18.	29-626	29-689	29-883	29-06	29-55	29-89	55-8	48-3	62	45	49	53	42	...	...	51
19.	30-080	30-132	30-060	29-60	29-93	30-01	47-3	46-6	56	34	45	52	42	...	...	49
20.	30-052	30-138	30-060	29-52	29-96	30-05	52-8	41-3	60	40	53	58½	46	...	0-18	48	
21.	30-216	30-305	30-202	29-67	30-18	30-21	47-8	41-6	54	42	46	63	35½	...	...	40
22.	30-344	30-393	30-361	29-83	30-25	30-20	48-8	44-3	64	36	49	60½	36½	...	...	45
23.	30-356	30-361	30-229	29-75	30-10	29-89	57-7	44-2	71	51	58-5	56½	52	...	...	46
24.	30-172	30-182	29-953	29-47	29-82	29-57	61-5	53-3	67	55	61	60	45	...	...	53
25.	29-808	29-959	29-684	29-29	29-40	29-65	58-8	56-3	66	45	62	54	46	...	...	55
26.	29-844	29-962	29-764	29-26	29-63	29-73	54-6	49-4	65	38	48	56	41	...	...	50
27.	30-050	30-041	29-960	29-43	29-77	29-70	56-7	45-6	74	39	57	59	41	...	...	51
28.	29-926	29-960	29-887	29-35	29-58	29-65	60-8	50-9	77	39	61-5	59	41	...	...	52
29.	30-088	30-284	30-120	29-37	29-84	30-07	60-7	55-0	70	44	60	59½	44	...	...	52
30.	30-398	30-388	30-365	29-76	30-10	30-05	61-4	51-4	73	48	62	57	40	...	...	54
31.	30-400	30-379	30-326	29-71	30-00	30-00	63-8	56-4	80	44	67	64	50	...	...	56
Mean.	29-911	29-948	29-867	29-33			56-3	49-6	67-00	45-32	54-2			Sum. 2-32	2-20	2-46	Mean. 51-1





ANNALS OF NATURAL HISTORY.

XLIII.—*Remarks on Du Petit Thouars's Theory of the Origin of Wood.* By EDWIN LANKESTER, M.D., F.L.S., &c.*

THE origin of wood has long been a question of difference amongst botanists, and although the increasing attention paid to botany has rendered this subject much more intelligible, yet at the present time the most eminent men are divided upon the subject. In entering upon this question, it will perhaps be better to refer to the generally received views of botanists upon the formation of the tissues of plants, as upon these views the whole matter depends; and in these observations I shall refer to the last edition of Dr. Lindley's 'Introduction to Botany.' Adopting the classification of Meyen, Dr. Lindley divides the primary tissues of plants into five, viz. 1. Cellular Tissue (*Parenchyma*); 2. Pitted Tissue (*Bothrenchyma*); 3. Woody Tissue (*Pleurenychyma*); 4. Vascular Tissue (*Trachenchyma*); and 5. Laticiferous Tissue (*Cinenchyma*). These tissues are all of them composed of two primary elements, membrane and fibre, and the formation of the latter can be traced to an organic mucus (vegetable gelatin of Schleiden), supposed to be universally present in or between the cells of growing tissue†. "However different," observes Dr. Lindley, "these tissues may be from each other, in station, function, or appearance, there is no doubt that all are in reality modifications of one common type, the simple cell;" and the observations of Mirbel on the development of Marchantia seem to confirm such a view. Thus while the tissues

* Read in the Natural History Section of the Meeting of the British Association, Birmingham, 1839, and communicated by the Author.

† See Schleiden's Beiträge zur Phytogenese in Müller's Archiv, No. 2, 1838, of which an admirable translation appeared in Part VI. of Taylor's Scientific Memoirs; also Lindley's Introduction to Botany, 3rd edition, p. 2; and Meyen's Neues System der Pflanzen-Physiologie, 1 Band.

are separated from each other for practical purposes, there can be little doubt as to their common origin.

But whilst botanists have admitted that the tissues are thus developed from a common form, there is still considerable difference among them as to the precise manner in which this is accomplished. This remark applies especially to the formation of the woody tissue, and the varied opinions of botanists on this subject have given rise to the interminable discussions on the origin of wood. Although much has been written on this subject, the whole question may be summed up in the words of DeCandolle, "Either there descend from the top of a tree the rudiments of fibres which are nourished and developed by the juices springing laterally from the body of wood and bark; or new layers are developed by preexisting layers which are nourished by the descending juices formed in the leaves." The latter is the view adopted by DeCandolle, whilst the former originated with Du Petit Thouars, and these views are respectively advocated by Professors Henslow and Lindley in their works in this country.

In order to give a clear view of opinions on this subject I extract the following passages from Dr. Lindley's work. After referring to some experiments of Knight, he says, "An inference is drawn that the wood is not formed out of the bark as a mere deposit from it, but that it is produced from matter elaborated in the leaves and sent downwards, either through the vessels of the inner bark along with the matter for forming the liber by which it is subsequently parted with; or that it and the liber are transmitted distinct from one another, the one adhering to the alburnum, the other to the bark. I know of no proof of the former supposition; of the latter there is every reason to believe the truth."

In giving the views of Du Petit Thouars, he uses the following passage: "It is not merely in the property of increasing the species that buds agree with seeds, but that they emit roots in like manner; and that the wood and liber are both formed by the downward descent of bud-roots, at first nourished by the moisture of the cambium, and finally imbedded in the cellular tissue, which is the result of the organization of that secretion". From these passages I think we must infer that

these observers suppose that woody fibre is not formed but by the aid of buds or leaves. Here then occurs the question as to what is woody fibre. And can any essential difference be pointed out between it and the cellular tissue in which it is imbedded? The most prominent features of woody tissue are its length, and the hardened secretions which are deposited in its interior. But these are not positive differences, as cellular tissue, as it is called, is frequently found elongated as in the tissue called "pitted" or *Bothrenchyma*; whilst on the other hand we frequently find it in a state as hard as that of the most hardened woody tissue, as in the endocarp of many fruits. If then the term wood in these passages is intended to apply to all hardened lengthened tissue, we ought to be able to trace its origin to leaves or buds wherever it is found. But in many instances we have lengthened and hardened tissue, or both combined, in cryptogamic plants, which develop no buds or leaves, as in some species of fungi belonging to the genera *Thelephora*, *Boletus*, &c.

There are also many parts of phanerogamous plants which possess hardened and lengthened tissue, which do not appear to come under the descending influence of the fibres from leaves or buds, such as the endocarps of amygdalaceous fruits, and the pericarps of a great variety of other fruits. The peduncles or flowerstalks in many plants possess woody tissue, but have no leaves, as also the stems of many endogenous plants which have no regular leaves.

Among the stems of exogens and endogens we shall find that there are many instances in which wood is formed without leaves. I have examined the stems of leafless monotropas, and find they possess woody tissue. In the stems also of leafless *Cactaceæ* woody tissue is deposited in abundance. If we examine also trees that have been wounded, we shall find that the lower lips of the wound have been filled up with woody tissue, and in such a manner as not to be explained upon the supposition that the wood at this point has been formed by the descent of fibres that had been formed and sent down from the leaves.

Another point to which I would wish to direct attention is the formation of woody fibres in tissue formed after trees have

been cut down. During the early part of this summer I found upon the stems of several elm trees that had been cut down a development of hard new matter between the bark and the wood of the tree: on submitting portions of this secreted matter to the microscope, I saw distinctly delicate fibres running in the direction of the fibres of the bark and wood. On the stumps of the trees on which this matter was found there were no branches or buds; and as the stems had been removed the preceding year, these fibres must have been formed independent of either buds or leaves.

In order to satisfy myself of the correctness of these observations on the exudation of wood from the stumps of trees, in the latter end of the month of March of this year, I cut away an entire ring of bark about an inch in length from the branches of several young beeches. At this time the sap was rising and the bark was easily removed from the alburnum on which it lay. On the 6th of this month (Aug. 1839) I removed some of these branches, which presented the following appearances. The lips of the wound both above and below presented a hardened exudation, which on being cut into was softer than the surrounding tissues. This exudation was most abundant on the upper lip of the wound. On removing the bark from around the edges of the denuded surface a portion of the exuded matter came away with the bark, whilst another portion was left in connection with a layer of alburnum that had been formed subsequently to the removal of the bark of the trees. The section of the bark on the upper edges of the wound presented the same appearances, but the layer of alburnum was thicker. On examining the exuded matter by the microscope the external portions consisted of cellular tissue, but it was distinctly fibrous where it united with the wood of the liber and the alburnum. From these experiments it will be seen that woody tissue as it existed in the exuded matter from the lower edge of the cut, and in the alburnum under the bark at the same point, must have been formed independent of the descent of any fibrous matter between the bark and alburnum from the leaves on the tree above the wounded part.

The last occurrence which I shall mention in the organization of vegetables, which appears to offer an argument against

the views of Du Petit Thouars, is the existence of woody excrescences in the bark of trees. They present themselves most frequently on the beech in the form of a nodule projecting from the bark of the trunk of the tree. On examining them it will be found that they have no connexion with the wood of the tree, and consist of several layers of contorted woody tissue enveloped in a bark of their own, consisting of liber and cellular integument. They are of all sizes, from those commencing existence not bigger than a pin's head, to some that attain the size of an orange. The smallest appear to consist of nothing but cellular tissue; but as they increase in size a little spot can be seen in the centre, which appears to be the commencement of the formation of woody tissue. As they increase an obvious separation takes place into a central nucleus of woody tissue, and an enveloping integument consisting of woody and cellular tissue. In the spring, when the cambium is found to exist between the bark and wood of the tree, it is found in these excrescences; the nucleus of wood is then easily removed from its bark, and frequently falls out when the bark is broken. On some of them, and especially the smaller ones, buds are observed at the beginning of the year, but these seldom produce leaves. They are more abundant on the beech than any other tree, but are frequently met with on the elm, oak, walnut, crab, sycamore, &c. On cutting into the nucleus several layers of wood can be distinguished, which by maceration can be separated from each, indicating undoubtedly their yearly growth.

Sometimes a large number of these nodules are developed together, forming one large knob: this occurs particularly in the elm and acacia, the wood of the latter of which is frequently used for ornamental cabinet-making, on account of the beautiful markings which the central points and the concentric lamellæ of the nodules afford. These large knobs seldom develope branches, and although in these cases they lie in contact with the wood of the trunk of the tree, yet a distinct separation can be observed between the wood of the knobs and the wood of the tree. This separation is so evident in many cases, that it is obvious the wood of the knobs had not a common origin with the wood of the trunk. The bark of the knobs and the trunk are continuous.

Since the greater part of these observations were made, the third edition of Dr. Lindley's 'Introduction to Botany' has appeared, in which I find he has noticed these formations under the name of *embryo-buds**, a name given to them by Dutrochet. In his remarks, Dr. Lindley observes, that he cannot reconcile the statements of Dutrochet, that they secrete an independent cambium, and are "certainement" connected with the wood of the tree. I have not seen Dutrochet's notice of these bodies, but I can so far confirm his remarks, as to say, that in most which I have examined there is a secretion independent of the wood of the trunk, and that in others there is a connexion, or rather a conjunction with the wood of the trunk. This latter occurrence takes place occasionally where the buds have been developed into branches, which is very seldom.

The existence and growth of these bodies cannot be easily explained on the theory of Du Petit Thouars, and Dr. Lindley admits them to be one of the greatest objections.

The only explanation that I can imagine the advocates of this theory could offer, would be that the wood in the knobs is formed by leaves which are occasionally developed, and not every year with the leaves of the branches. To this I would answer, that although I examined hundreds of these knobs during the spring and summer of 1838, I never found any leaves upon them; and it was only by a much more extensive examination this year, that I found five or six knobs with leaves upon them.

The preceding observations have been made in the hope that they might not prove uninteresting to those engaged in botanical inquiries, and especially as the facts related have led me to doubt the correctness of that theory which at one time I considered as firmly established.

Campsall, near Doncaster, Aug. 1839.

NOTE.—Since the foregoing remarks were written some valuable contributions to this department of inquiry by Dr. Schleiden of Berlin have been published in the 'Annals of Natural History,' and other publications in this country. His paper on the Anatomico-Physiological Differences in the Structure of Stems, in the December Number of this Journal,

* From a further examination I think a more appropriate designation for these bodies would be *abortive branches*.

points out the unsatisfactory nature of the present views of botanists on this subject, and will, it is to be hoped, open the way for further investigations on a very important branch of inquiry. From Dr. Schleiden's "Contributions to Phytogenesis" I am happy to make the following quotation in support of the views I have advanced. "The spiral vessels," he says, and the same remark would apply to woody fibre, "begin to be visible in the newly formed parts, and also in the entire bud, always in the immediate vicinity of old already formed spiral vessels, and they proceed in this manner away from the stem into the new parts. I do not understand therefore what is meant when the fibres of the stem are regarded as proceeding from the buds; one might just as well consider the river as running from the ocean to its source." (Taylor's Scientific Memoirs, vol. ii. p. 303.) I have also lately received Meyen's Neues System der Pflanzen-Physiologie, and to those who are interested in this subject, I would recommend the observations made by that able and laborious botanist 'on the formation of the new wood and bark,' in the first volume of the work. "The Theory" (of Du Petit Thouars), observes Meyen, "on the formation of the new wood is truly very intellectual, and although many have given their word for its correctness, it is yet nothing more than a pretty picture with many defects."

XLIV.—On the *Teucrium regium* of Schreber. By CHARLES C. BABINGTON, Esq., M.A., F.L.S., F.G.S., &c.

THE determination of a doubtful species must always be a subject of great satisfaction to botanists, and I am therefore much pleased that it has fallen into my power to do a little towards the elucidation of a plant considered as a "species dubia." The plant to which I refer is the *Teucrium regium* of Schreber, which is stated by that author to be a native of Spain, and, by Morison, of Italy; but of which Mr. Bentham (Labiatae, p. 683) appears not to have seen a specimen. A plant bearing that name has been in my possession for several years, having been gathered by M. Fleischer for the Unio Itineraria "in fruticetis Smyrnæ;" and upon comparing it

with the description by Schreber, I find it to agree perfectly, and have therefore no doubt of its being the plant intended by that author.

Within the last year my friend the Rev. C. A. Stevens forwarded to me for examination a specimen of *Teucrium* which he was unable to refer to any species with which he was acquainted; and upon its examination I came to the conclusion that it was a truly distinct species, and, as I believed, quite undescribed; but upon comparing it with the Smyrna specimen of *T. regium*, which I had previously overlooked, I found that they exactly corresponded, and in short that Mr. Stevens's plant was certainly *T. regium*.

This latter specimen was gathered in Aug. 1836, "on the south-west declivity of the Blohrenge, at about two miles from Abergavenny, Monmouthshire," by Mr. E. Y. Steele, and so, being a native of England, it becomes even of more interest than if it had been only a "species dubia."

I have now the pleasure of giving a specific character and description of the plant, together with drawings of the different parts requisite for its elucidation.

T. regium (Schreb.). Suffruticosum; ramis subsimplicibus pubescentibus, foliis ovatis basi cuneatis irregulariter crenatis pubescentibus subtus tomentosis, floralibus minoribus ovato-rhomboides acutis subintegris, verticillastris 1—5 floris superioribus contiguis racemosis, calycibus villosis, corollis barbatis.

T. regium purpureum, *Moris. hort. bles.* 311.

T. lucidum parvo folio, flore venuste purpureo.

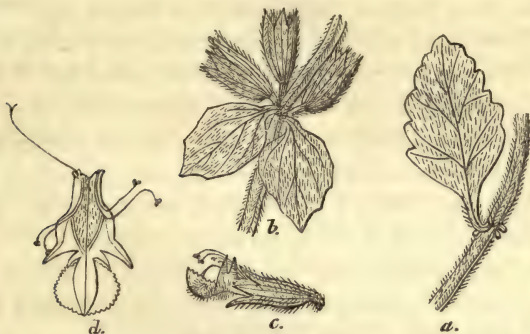
Pluk. alm. p. 363. t. 65. f. 1. *Moris. hist.* 3. p. 422. n. 5.

T. regium, *Schreb. Unilab.* 35. *Benth. Lab.* 683.

Stem diffuse with long simple branches, hairy with deflexed hairs, square, internodes about $1\frac{1}{2}$ inch long. Leaves ovate with a wedge-shaped base, the upper half having a few large and deep crenatures, not inciso-crenate as in *T. chamædrys*, shortly stalked, finely downy above, pubescent beneath; the floral leaves between ovate and rhomboid, nearly entire, or with a few, one or two, small teeth above their middle, sometimes slightly coloured, all of the same form, and not gradually changing into the ordinary leaves at the lower part of spike as is the case in *T. chamædrys*. Flowers from one to five in

each verticillastrum, rather larger than those of *T. chamædrys*, shortly stalked; calyx between tubular and bell-shaped, about as long as the floral leaves, the teeth lanceolate, nearly equal, slightly spreading, slightly tinged with purple; corolla yellow with a darker reddish tip, bearded below, and with a broad

Teucrium regium.



band of hairs pointing downwards on the under side within the tube.

This plant is distinguished from *T. chamædrys* by the distinct line of separation between the floral and other leaves, the rhomboidal form of the former, and by the latter being ovate-crenate, not ovate-oblong and incised, the much longer internodes, and nearly simple branches.

Hab. Spain, *Schreber*; Italy, *Morison*; Smyrna, *Fleischer*; near Abergavenny, England, *Mr. E. Y. Steele*.

St. John's College, Cambridge, June 6, 1840.

EXPLANATION OF THE FIGURES.

- a.* Represents a lower leaf.
- b.* Floral leaves and verticillastrum.
- c.* A flower.
- d.* A flower expanded so as to show the form and interior.

XLV.—On the Strength of the Vital Principle in Intestinal Worms. By Dr. C. E. MIRAM, Teacher of Zoology and Comparative Anatomy in the Academy of Wilna*.

OF the cold-blooded Vertebrate Animals, and especially of the Amphibia, it is well known that they can pass years in a state

* From Wiegmann's Archiv, Part I. 1840.

resembling death; toads inclosed in blocks of granite, where they neither receive air or nutriment*, have lain torpid for an indefinite time, but again become animated as soon as they were exposed to the atmosphere. This death-like state might be termed torpidity, as it were a prolonged winter sleep, for life has not totally quitted the body, and even this has remained unaltered or at furthest only somewhat shrunk up.

The Evertebrate animals appear, with respect to the strength of the vital principle, to stand on a far higher scale. If they are deprived of water, which is necessary to their life, they shrivel up and become perfectly dry, but may again be restored to life when after a shorter or longer period they are exposed to favourable influences. Who has not been struck by the remarkable experiments of Spallanzani on this subject? From him we know that *Furcularia rediviva*, a species of *Vibrio*, and the of late much spoken-of *Macrobiotus Hufelandii*† belonging to the Crustacea, after having passed years in a perfectly dry state, might be restored to life by a drop of water,—a slight moistening is sufficient to call them again into existence.

Some intestinal worms are also remarkable from having a similar peculiar tenacity of life. Rudolphi‡ mentions a remarkable example of *Ascaris spiculigera*. He received from M. Peterson of Kiel three sea crows (*Pelecanus Carbo*) which were shot there on the third of May and immediately placed in alcohol and forwarded to Berlin. On the 14th of May, therefore after 11 days, Rudolphi opened the alimentary canal and the stomach of one of these birds, which was highly impregnated with alcohol, and found some specimens of the above-mentioned worm, which however seemed to have been killed by this treatment, and had become already hard and brittle in the spirits. In order to soften and restore them to

* We should not consider the degree of assurance upon this subject to be at all so strong as that which the writer seems to entertain, especially as regards granite.—Ed.

† This microscopic crab is not, as stated by Schulze (*Macrobiotus Hufelandii*, animal e crustaceorum classe novum, reviviscendi post diurnam asphyxiam et ariditatem potens, descriptus a Aug. Sigismundo Schulze, Berolini, 1834), a new animal, but Spallanzani's Tardigrade, Müller's *Acarus ursellus*, Schrank's *Arcticon tardigradum*, and Ehrenberg's *Trionychium ursinum*.—Wiegmann.

‡ Entozoorum Synopsis, Berolini, 1819, p. 290.

their natural form he placed them in warm water, and, behold! they began to move, and were soon perfectly restored to life.

To this interesting fact I can now add the remarkable observation of a restoration to life of *Ascaris Acus*, Blochii, which I happened to make in the month of April of this year (1839), and which is certainly quite as astonishing as the case related by Rudolphi.

I received the intestines of a very large pike, which was to be stuffed for the museum of this town, and found a considerable number of *Ascaris Acus*, partly among the intestines and in part on the edge of the plate; and as they were placed on it without any moisture, several which were not in contact with the moisture of the intestines were already perfectly dry and dead; many were dried so firmly to the plate that they could not be removed without destroying them. In order to obtain as many good specimens of this worm as possible, I filled the vessel with cold water and picked out the living individuals, but was astonished to find so many alive. I had soon collected all the *Ascarides* that moved, and placed therefore the intestines in another vessel, and left the plate to stand with the water, but came accidentally after some minutes to the table where it stood, and was not a little surprised to find the water again all alive with these little worms. I observed minutely the dead and dried *Entozoa*, and convinced myself that these actually, when they had imbibed moisture and thus reacquired their previous volume, moved about with the greatest ease in the fluid; nay, I even saw that some worms which were not wholly touched by the water exhibited life in that portion only which had imbibed some. Thus, some moved the anterior part of the body, while the hinder portion adhered dried on the plate; others moved the posterior portion, while the anterior shrivelled portion was fixed to the vessel.

Wilna, October 2, 1839.

XLVI.—*Excerpta Botanica, or abridged Extracts translated from the Foreign Journals, illustrative of, or connected with, the Botany of Great Britain.* By W. A. LEIGHTON, Esq., B.A., F.B.S.E., &c.

No. I. *On the Functions of the Hairs on the Stigma in the Fecundation of the Campanulaceæ.* By ADOLPHE BRONGNIART. (Ann. des Sc. Nat. n. s. xii. 244.)

THE upper surface of the stigma of the Campanulas is, as has been long known, clothed with long hairs, arranged in regular longitudinal lines correspondent to the number and position of the anthers, and especially visible in the flower-bud before the emission of the pollen. The connexion between these hairs and the pollen was first observed in many species of *Campanula* by Conrad Sprengel, subsequently with greater care by Cassini in *Campanula rotundifolia*, and has been since detected by Alphonse DeCandolle in all the Campanulaceæ, with the exception of the small genus *Petromarula*. On the dehiscence of the anthers previously to the expansion of the corolla, and whilst the stigmas continue still convergent, these hairs are found covered with a considerable mass of pollen, brushed as it were from the cells of the anthers. On the expansion of the corolla the stigmas separate and curve backwards, the anthers having shed their pollen wither away, the pollen deposited on the exterior of the stigma becomes detached, and the hairs disappear, leaving only slight asperities visible on the surface of the stigma. According to Cassini and DeCandolle these hairs are caducous. M. Adolphe Brongniart by a microscopic examination proves that they are not deciduous, but exhibit a phænomenon quite unexampled in the vegetable kingdom; viz. that they are retractile, similarly to the hairs of certain Annelides, or the tentacula of Snails. A longitudinal section of the style previously to the emission of the pollen shows these hairs to be cylindrical, slightly attenuated at the apex, and formed by a prolongation of the external cuticle of the epidermis, perfectly simple, and destitute of articulation or partition even at their base. Immediately under the base of each hair, in the subjacent cellular tissue, is a cavity equal in depth to one half or one third of the length

of the hair continuous with the cavity of the hair itself, and to all appearance filled with the same fluid. This basal cavity does not extend beyond the superficial layer of the stigma, and has no connexion whatever with the tissue which lies at a greater depth.

On the expansion of the corolla, these hairs, which had before continued extended and covered with grains of pollen, retreat into the basal cavity in the cellular tissue, their terminal portion insheathing itself in the lower portion gradually as this lower portion itself retires into the basal cavity in the cellular tissue, until the apices alone of the hairs remain slightly projecting from the external surface of the stigma. In their retreat the hairs frequently draw along with them some grains of pollen, which apparently penetrate into the tissue of the style, but which in reality remain always in contact with the exterior surface of the hairs, as is clearly proved by applying the point of a needle and causing the hairs to reissue from their insheathment, when the pollen grains are instantaneously expelled. The pollen grains undergo no modification either during their application to the hairs or when drawn along with them in their retractile movement, and consequently no connexion exists between them and the interior of the style. The probable cause of this retractile movement Brongniart attributes to the absorption of the fluid contained both in the hair and in the cavity at its base.

Cassini, A. DeCandolle, Treviranus, and Link are of opinion that fecundation is effected by the action of the pollen on these hairs, but in Brongniart's estimation erroneously. For on dissecting the true stigmas of the Campanulas, viz. the internal surface of the stigmatic branches, after their divergence, the pollen grains are found dispersed on this surface and adhering to it as on all true stigmas, at first by the lubricating moisture of the part, and subsequently by the development and penetration of the pollen-tubes, which very soon extend into a bundle of fine elongated utricular tissue occupying the centre of the style. This tissue is in form hexagonal, perfectly distinct from the surrounding tissue, much denser, and coloured. Its separation is easily effected when it is found composed of cylindrical or slightly fusiform elongated utri-

cules, which are coloured, laterally free, articulated to each other end to end, and containing very minute globules of fecula which turns blue on the application of iodine. The pollen-tubes which penetrate between the utricles of this tissue are readily detected by their much greater tenuity, the absence of articulations, and the very minute granules inclosed in them.

These observations satisfactorily dissipate all doubts as to the functions truly stigmatic performed by the parts which in the Campanulas correspond in position and appearance to the stigmas of other plants, and prove that these collecting hairs ("*poils collecteurs*") exercise only a secondary office in fecundation.

XLVII.—*Sketch of the Natural History of Leeds and its Vicinity for Twenty Miles.* By HENRY DENNY, Esq.

IN submitting this outline of the vertebrate inhabitants of the district of twenty miles round Leeds, I do not wish it to be considered as anything like perfect or complete. I have only inserted what have come under my own immediate knowledge and inspection, or have been communicated by scientific friends residing in the neighbourhood. There are many sources from which information might have been obtained to swell this list, I am fully aware, but to these I have not had access; such a skeleton as it is, however, I am not without hopes may be of service, as a foundation for the cultivators of natural history whose eye it may chance to meet, and whose means of acquiring important additions or corrections will enable them to finish the sketch which I have only attempted in outline. Of the mammalia frequenting this neighbourhood but little can be said; indeed little can be expected in the vicinity of large manufacturing towns, surrounded on all sides by smaller seats of industry, for such many of our villages are become, together with the clearing of moorland and inclosing of commons, numerous new roads, &c., the necessary concomitants of the spread of population and commerce, all of which are inimical to the wild inhabitants of a country.

Beginning with the order *Feræ*, I very much doubt whether

the Badger is ever found within our district, although I have been informed to the contrary. It might probably many years ago occur in some of the extensive woods which surround us; for though it is frequently baited, and specimens living and dead offered annually for sale, these are all, I believe, brought from the neighbourhood of Malton in the North Riding. The Weasel, Stoat, and Polecat are tolerably frequent, more especially the two former; for though the latter is by no means scarce, still its geographical distribution upon the whole is more circumscribed. But the Pine Marten or Common Marten (for it still appears a disputed point with some writers whether they are specifically distinct) is rare with us. Two or three have occurred within the last year; one at Swillington Bridge, another near Selby; of a third example which came under my notice, I could not trace the locality, but as it was lying at the window of a bird preserver's shop, *unskinned*, it had most probably been killed somewhere near. If the specific character of the Pine Marten is really the yellow breast, these specimens were all of that species; yet the situation in which they were found would differ widely from the reputed haunts of that animal, which is said to frequent the pine woods of Scotland and other wild situations. Those again which I have seen from the neighbourhood of Ross-shire were considerably larger; I should not hesitate to say nearly double the size of ours. The Otter frequents most of our streams and rivers and inland lakes: very large individuals have been killed both in the Ayr and the Wharf. At Killingbeck, near Leeds, where they used to breed annually, but are now I believe extinct, I have tracked them during the day by their fæces, composed of the remains of fish bones and scales, and also by their foot-marks in the mud; but owing to their excessive shyness they would not pass by the same path on the following day if the spot was much trodden. From this place I obtained a young Otter, which I kept for many weeks, and which became quite tame and the pet of the family; it followed the inmates of the house up and down stairs like a puppy, and like the same animal expressed its uneasiness when it lost any of them by squeaks, but exhibited great signs of pleasure when played with, by romping or gal-

loping in an awkward manner to and from the party, and appeared to sleep with comfort upon the servant girl's lap. It was exceedingly ravenous, and would eat small birds with as great a zest as fish and milk.

The Fox is of more frequent occurrence, and so long as there are several zealous foxhunters in the district its breed will be preserved; we have two varieties, distinguished by the appellations of Hound or Dog Fox, and Cur Fox; the former a larger animal than the latter.

The Mole is very abundant, and not unfrequently of a dun colour, as also of a grayish lead colour. I do not know a more pleasing little animal to have in captivity than this; its motions are so rapid and its sense of smelling and hearing so acute. The Mole soon becomes reconciled to a box of earth, and may frequently be seen peeping out of its burrow or searching the spot allotted for food. One which I kept for a few days would come to the surface almost immediately on my holding a piece of fresh meat to the mouth of its hole, seize the morsel, and retreat backwards with the greatest facility to devour its meal, and soon reappear for a fresh supply. The digestive organs of this animal act so rapidly that it is in almost constant want of food, and soon dies if not frequently supplied. I suspected that mine died from drinking too much milk, which I used to give it in a teaspoon, and of which the little creature appeared exceedingly fond; drinking very freely, and thrusting its nose into the milk as a pig does into its trough.

Of the genus *Sorex* only three species have come under my notice, the *Araneus* and *fodiens*. I suspect however the *remifer* occurs also; for the only Shrew which was preserved in our Museum until last year was a bad specimen of that species, and which I have no doubt whatever was killed in the neighbourhood. The *S. fodiens* is said to be very expert at catching the *Gyrinidæ*. The *S. Araneus*, which is abundant, may be seen here as elsewhere very frequently lying dead in the lanes and hedgerows in autumn, some seasons especially, in numbers: the cause, however, of this singular fatality appears still a mystery. I have heard it stated by persons residing in the country, that the Shrews fight furiously, and thus destroy

each other ; if so, they must have some peculiarly vulnerable part at which the antagonist aims, and from which death will ensue quickly, without showing any outward scars : whatever the cause may be, it must result from some sudden effect, as the animals appear in good condition and not wasted by disease. If the former account be correct, it is still to be discovered what causes this pugnacious propensity, for did it arise during the season of pairing the victims would be males ; but I am not aware whether it is the fact that one sex suffers more than the other, nor whether the autumn is the season of love. The Shrews are very much infested by two small species of *Acarus* ; and I once found a minute *Pulex*, but never discovered a single example of *Pediculus*.

The Hedgehog is tolerably plentiful in some parts, but rather local in others ; for instance, I am informed that in the neighbourhood of Hebden Bridge, near Halifax, it is rarely ever seen. Is this owing to the district being more mountainous and bleak ? Of the *Vespertilionidæ* I have observed only four species : *Vespertilio Noctula*, the most common, on the meadows near the town, hawking about after insects. The *Nattereri* I believe has never been recorded as a Yorkshire species ; a living pair however were brought me for the Museum of our Society last June taken out of an old tree in Oakwell Wood near Birstall. The *Plecotus auritus* is next to the *Noctula* in point of frequency, generally dashing along the streets on a summer's evening and entering old buildings. The *pipistrellus*, though not so common as the last, is by no means scarce, and frequents the same localities. Of the *Glîres*, in addition to the common mouse, which appears, like the nettle, to be a general associate of man, we have, with two exceptions, all the British species. The *Mus sylvaticus*, which is plentiful, assumes a grayish colour towards winter, and in some specimens loses nearly all the white on the under parts of the body. I am informed there is a small mouse which builds its nest amongst bushes on marshes near Selby. I have only seen a skeleton which was said to belong to this species, which however did not present any peculiar character except size. The Harvest Mouse, *Mus messorius*, I have never seen. The Brown Rat, it is almost superfluous to say,

is common enough : we have a specimen of a light cream colour. I have been informed that the Black Rat (*Mus Rattus*) has occurred at Selby, but even if this is correct, there is no doubt it has been brought in some vessel with merchandize. The Water Campagnol (*Arvicola amphibia*), and the Field Campagnol (*A. agrestis*) are pretty generally dispersed. Of the Bank Campagnol (*Arvicola riparia*) only two examples have come to my knowledge from Halton near Leeds.

The Dormouse (*Myoxus avellanarius*), although not a scarce animal, is only locally distributed ; I am informed it is more frequently met with in woods near Selby.

The Squirrel (*Sciurus vulgaris*) is confined to the more extensive woods, such as those of Bolton, Harewood, Temple Newsam, &c., where it may be seen in all its lightness and dexterity vaulting from tree to tree. In the neighbourhood of Birstal however it is never seen. The Rabbit (*Lepus cuniculus*) and the Hare (*Lepus timidus*) are plentiful throughout the district.

Of the *Ruminantia*, not properly wild, we have the Red Deer (*Cervus Elaphus*) at Bolton, the seat of the Duke of Devonshire, and the Fallow Deer (*Cervus Dama*) in the same park, as also those of Temple Newsam, Denton, &c.

Of the order *Cetacea* we cannot be expected to boast of many examples, owing to our distance from the coast. The Porpoise however (*Delphinus Phocæna*) has occurred several times in the Ouse at Cawood, where they have made their way from ocean by the Humber, into which the Ouse flows. I am informed by Mr. Teale that the Grampus (*Delphinus Orca*) has also been seen there.

If the limited as well as inland situation of the district be considered, our share of the resident as well as migratory Birds of this island is very considerable, though from the circumstances alluded to we are necessarily deprived of many whose habits are more maritime or mountainous. The nearest sea coast being about eighty miles from our extreme limit, the occurrence of some species recorded in this list will of course be solely owing to adverse winds, stress of weather, &c. Again, great lights are well known to attract birds in passing by night from one portion of the island to another. This

has frequently been observed in the neighbourhood of light-houses. We have no buildings of this nature, but the large fires kept constantly burning at some of the iron works, potteries, and glass-houses, &c., such as those of Low Moor, Bowling, Kirkstall, &c., act in a similar way upon birds passing from the north and east to the west coast. The fires from the first have been seen as far distant as the Wolds, nearly forty miles. As the occurrence of one bird in particular, mentioned in this list, may be questioned from its extreme rarity (*Cursorius isabellinus*), I have only to observe, that I did not see the specimen myself, but I have seen a most accurate and highly finished drawing taken from the bird, which was in such a mutilated state when it came into the possession of my friend George Walker, Esq. as to render its preservation impossible, having been killed several days; but from his sound practical knowledge as a naturalist, and his abilities as an artist, which are well known in this neighbourhood, there cannot remain the least doubt as to the authenticity of the species. I may add, that its peculiar habit of running, and now and then taking short flights, struck the person who shot it (who however was no ornithologist) as something new, and its beak again being different from the Plovers, for which he at first mistook it, caused him to keep it.

RAPTORES.

Aquila Chrysaetos. But one instance of this bird has occurred, which was a specimen shot in Stockeld Park, near Wetherby, Nov. 29, 1804.

Pandion Haliaetus. A single specimen shot in Stainland Dean, near Halifax, a few years since; another occurred at Farnley in 1833; two or three others have been found a few miles beyond our limits.

Falco peregrinus. Rare. Tadcaster and Craven.

Falco Subbuteo. Rare. Halifax, Barden, and Bolton.

— *Æsalon*. Rare. Allerton Park.

— *Tinnunculus*. Not uncommon. Killingbeck, Swillington.

Accipiter fringillarius. Common. Halifax, Swillington, Killingbeck.

Milvus Ictinus. Rare. Occasionally near Halifax; probably more plentiful formerly, as the name of a gentleman's seat near Leeds would lead us to suppose. Gledhow, i. e. Glead?

- Buteo vulgaris*. Rather rare. Halifax and North Deighton.
 — *apivorus*. Very rare. One shot near Harewood about 1824, which came into the possession of Mr. Calvert of Leeds, afterwards to Dr. Leach's collection, Brit. Mus.
 — *Lagopus*. Very rare. Formerly at Blackhill when a rabbit warren.
Circus rufus. Rare. Halifax.
 — *cyaneus*. Rare. Halifax, Thorp Arch, Selby.
Bubo maximus. One shot at Horton near Bradford about 1824.
Otus vulgaris. Not uncommon. Swillington, Halifax, Killingbeck, Scarcroft.
 — *Brachyotos*. Not uncommon. Halifax in Sept., and some seasons rather common. Killingbeck.
Strix flammea. Common. Mr. Waterton has observed this species dart down and catch fish from his lake.
Syrnium Aluco. Not common. Barwick in Elmet, Walton Park, Greetland.
Noctua nyctea. A pair observed on Barlow Moor near Selby: the male shot Feb. 13, 1837, and is now in the possession of A. Clapham, Esq., Potternewton.

INSESSORES.

- Lanius Excubitor*. Rare. Halifax, breeds at Wike; Rothwell.
 — *Collurio*. Not uncommon. Killingbeck, Osmondthorp, Halifax.
Muscicapa grisola. Not uncommon.
 — *luctuosa*. Breeds occasionally near Halifax, Ovenden, Harewood, Bolton Abbey, and Killingbeck.
Cinclus aquaticus. Not uncommon. Halifax, Bolton, Adel-beck, &c.
Turdus viscivorus. Occasionally.
 — *musicus*. Rarely seen in winter: makes its appearance about 8th or 9th of March.
 — *iliacus, Pilaris, Merula*. Common.
 — *torquatus*. Breeds in Ogden Clough, near Halifax, Rocking Moor and Craven.
Accentor modularis. Common.
Sylvia Rubecula, phænicurus. Common.
Salicaria Locustella. Rather rare. Halifax, Killingbeck.
 — *Phragmitis*. Swillington, Brotherton.
Philomela Luscinia. Rare. Walton Hall and Bramham Park, formerly in most of the woods in the neighbourhood.

Curruca atricapilla, hortensis, cinerea, curruca, Trochilus, Hippolais.

All more or less common.

Regulus aurocapillus. More or less common.

Motacilla alba, Boarula, flava. More or less common.

Anthus pratensis. Common.

Saxicola Œnanthe, Rubetra, Rubicola. Common on most of the large
moors,

Parus major, cæruleus, palustris. Common.

Parus ater, caudatus. More or less common.

Bombycilla garrula. Rare. Several occurred in 1829 at Halifax,
Woodlesford, Barwick in Elmet, and Huddersfield, feeding on
the berries of the mountain ash.

Alauda arvensis. Very common.

——— *arborea.* Rather rare. Halifax, Killingbeck, 1832.

Emberiza nivalis. Rather rare. Halifax, Birstal, 1839.

——— *miliaria.* Occasionally. Halifax, Burley, and Killingbeck.

——— *Schœniculus, citrinella.* Common.

——— *Cirlus.* Very rare. One occurred near Doncaster, as re-
corded by Mr. Neville Wood in the Naturalist.

Fringilla Cælebs. Very common.

——— *Montifringilla.* Not uncommon.

Pyrgita domestica. Very common.

——— *montana.* Occasionally, Potternewton, May 1839.

Coccothraustes vulgaris. Rare. Killingbeck, Halifax: a pair shot
near Harewood, 1838.

——— *Chloris.* Very common.

Carduelis elegans. Occasionally. Halifax, Craven, Killingbeck, and
Ferrybridge.

——— *Spinus.* Plentiful in some districts. Ferrybridge, Craven,
Halifax, banks of the Ayr near Leeds.

Linaria cannabina, minor. Common.

——— *Montium.* Osmondthorp, Halifax.

Pyrhula vulgaris. Not uncommon.

Loxia curvirostra. Occasionally. Halifax, Killingbeck. Several at
Meanwood and Huddersfield, 1839, feeding on the larch and
mountain ash. Several nests in Bramham Park this year, 1840.

Sturnus vulgaris. Common.

Pastor roseus. Rare. Ripley: one shot in the garden at Farnley
Hall, near Otley, 1828.

Corvus Corax. Rare. Occasionally at Walton Park.

——— *Corone.* Common.

——— *frugilegus.* Common.

Corvus Monedula. Rather local. Kirkstall Abbey, Halifax.

Pica caudata. Common.

Garrulus glandarius. Common.

SCANSORES.

Picus viridis. Occasionally. Halifax, Killingbeck.

—— *major*. Very rare. Halifax, Killingbeck, Selby, 4th March, 1839.

—— *minor*. Rare. Near Armley, 1837. Nest of five young, June, 1840.

Yunx Torquilla. Occasionally. Halifax, Killingbeck: formerly tolerably frequent near Leeds.

Certhia familiaris. Not uncommon. Harewood, Halifax, Leeds, and Middleton.

Troglodytes europæus. Common.

Upupa Epops. Very rare. One was shot by the Hon. Edwin Lascelles Oct. 8, 1830, at Eccup, a *young specimen* from a field of potatoes; another occurred at Low Moor.

Sitta europæa. Rather rare. Halifax, near Scarcroft, Harewood Bridge.

Cuculus canorus. Common.

Coracias garrula. Very rare. A fine specimen shot in Fixby Park, 1824.

Alcedo Ispida. Occasionally seen at Halifax, Armley, Killingbeck, Walton; a nest of five young ones were brought me May 28th from Horsforth.

Hirundo rustica, urbica. Common.

—— *riparia*. More or less common.

Cypselus Apus. More or less common.

Caprimulgus europæus. Occasionally. Killingbeck. Breeds on the moors near Halifax, Otley, and Craven.

RASORES.

Columba Palumbus. Common, especially at Walton Park.

Phasianus colchicus. Common. The ring-necked and mottled variety. Not uncommon.

Tetrao scoticus. Common on all the moors.

Perdix cinerea. Common.

—— *Coturnix*. Rare. Scarcroft, Killingbeck, Churwell; a nest was found on Skircoat Moor near Halifax.

GRALLATORES.

Cursorius isabellinus. Very rare. A specimen was shot in April 1816, in a fallow field near Wetherby, by Mr. Rhodes of that

place, which afterwards came into the possession of George Walker, Esq. of Killingbeck Lodge, near Leeds.

Edicnemus crepitans. Very rare. Seen near Selby a few years since.

Charadrius pluvialis. Occasionally near Halifax, Whinmoor.

———— *Morinellus*. Rare. Killingbeck, May 27, 1839.

Vanellus griseus. Halifax.

———— *cristatus*. Common.

Ardea cinerea. Not uncommon. Swillington, Scarthingwell, Walton. I know of only one Heronry in the neighbourhood, which is at Walton Park; one of eighteen or twenty nests was destroyed two or three years since at Scarthingwell.

Botaurus stellaris. Rare. A specimen was shot in Royds Hall Woods near Bradford, 1810; a second at Ilkley, Dec. 1838; a third near Selby, Dec. 1838.

Numenius arquata. Not common. Roggin Moor near Otley.

Totanus Calidris. Rare. Near Halifax and Selby.

———— *Hypoleucos*. Not uncommon. Halifax, Killingbeck, Rothwell.

Tringa Canutus. Rare. Killingbeck. A pair in 1839.

Scolopax Rusticola, *Gallinago*, *Gallinula*. More or less common.

Tringa subarquata. Very rare. Halifax.

———— *variabilis*. Rare. Halifax.

———— *maritima*. Ovenden Moor near Halifax, 1827.

———— *Ochropus*. Temple Thorp, Oct. 28, 1839. Birstal, 1840.

Phalaropus lobatus. Rare. Halifax, Low Moor, Holbeck Moor, 1823.

Rallus aquaticus. Common. Swillington, Dewsbury, Killingbeck.

Crex pratensis. Common. Boston, Halifax, Killingbeck, Leeds.

Gallinula chloropus. Common. Boston, Halifax, Killingbeck, &c.

Fulica atra. Occasionally. Swillington, Halifax, Walton Park; I saw thirty feeding together 12th Jan. 1835.

Order V. NATATORES.

Anser ferus. Not uncommon. Walton Park.

———— *albifrons*. Not uncommon.

———— *segetum*. Not uncommon. Killingbeck.

———— *Bernicla*. Rare. Rigton, 1837.

———— *torquatus*. Rare.

Cygnus ferus. Occasionally. Kirkstall, Dec. 1837.

Anas clypeata. Rare. Killingbeck.

———— *Strepera*. Rare. Swillington.

———— *acuta*. Rare. Scarthingwell, Walton.

Anas Boschas. Occasionally. Halifax, Walton Park, Swillington, Killingbeck.

—— *Querquedula*. Rare. River Calder near Copley mill, 1816.

—— *Crecca*. Common. Scarthingwell, Walton Park, Killingbeck.

Mareca Penelope. Not uncommon. Halifax, Swillington, Walton Park, where one hundred were seen feeding together, Jan. 12, 1835.

Oidemia nigra. Rare. Near Selby.

Fuligula ferina, *Marila*, *cristata*. More or less frequent. Swillington, 1838.

Clangula chrysophthalmos. More or less frequent. Swillington, 1838.

Mergus Merganser. Occasionally. Arthington, Halifax.

—— *serratus*. Rare. Swillington, Jan. 24, 1838.

—— *albellus*. Rare. Gledhow, Swillington, 1838.

Podiceps cristatus. Occasionally. Swillington, Jan. 1838, Halifax.

—— *rubricollis*. Rare. Near Ripponden in the winter of 1800.

—— *minor*. Not uncommon. Halifax, Killingbeck, Swillington, Walton.

Colymbus septentrionalis. Rare. Harehills Lane near Leeds, Jan. 1829, River Ayr, 1838.

Phalacrocorax Carbo. Rare. Walton Park, Bramham Park.

Sula Bassana. Rare. Rothwell Haigh, Kirkstall, April 1834, Hardhambeck and Ilkley, winter of 1838, after the second moult.

Sterna Hirundo. Rare. Knostrop, 1833.

Larus tridactylus, *canus*. Occasionally. Walton, Cawood, and Selby.

—— *fuscus*. Rare. Knostrop, 1840.

Procellaria pelagica. Very rare. Halifax, Rippon.

—— *Leachii*. Very rare. Skircoats Moor near Halifax, 1833.

REPTILIA.

The Reptiles occurring in this district are those which are pretty generally spread in most localities, and may be briefly enumerated as follows :

Lacerta agilis.	Natrix torquata.	Triton palustris.
Anguis fragilis.	Vipera communis.	—— punctatus.
	Rana temporaria.	
	Bufo vulgaris.	

PISCES.

Of the last class of vertebrata we are necessarily circumscribed as to species, in consequence of the geographical position of this portion

of the county ; our share therefore consisting, with two or three exceptions, entirely of freshwater fish.

ACANTHOPTERYGII.

Perca fluviatilis. Pretty generally dispersed.

Acerina cernua. Pretty generally dispersed.

Gasterosteus aculeatus, *trachurus*, *semiarmatus*. Plentiful. In most ponds, especially those in the neighbourhood of brick fields.

———— *Pungitius*. Not uncommon at Campsall, as I am informed by Dr. Lankester.

MALACOPTERYGII ABDOMINALES.

Cyprinus Carpio. Not uncommon in most ponds and lakes.

———— *Gibelio*. I have received this fish of various ages, from the same localities as the following species :

———— *auratus*. Exceedingly abundant in many of the reservoirs belonging to the factories, into which the water from the steam-engines is let off for the purpose of being cooled.

Barbus vulgaris. Not uncommon in running streams at Harewood, Bolton, Castleford, and Wakefield.

Gobio fluviatilis. Plentiful.

Tinca vulgaris. Rather locally dispersed. Kippax, Temple Newsam.

Abramis Brama. Not uncommon. Ferrybridge, Cawood. Our specimens have only 52 scales in the lateral line, while Mr. Yarrell describes 57.

———— *Blicca*. Rare. We have a single specimen caught at Cawood, but in the neighbourhood of Campsall I believe it is not uncommon.

Leuciscus rutilus, *vulgaris*. Common.

———— *leucophthalmus* ? Not uncommon. This, which appears to be a new species of *Leuciscus*, was detected by T. P. Teale, Esq. F.L.S. of Leeds. It approaches, in some respects, the *Dobula*, but not sufficiently to enable us to decide it as that species. It has been generally overlooked as the Dace, but differs from that fish in many material characters, as the proportion of the pectoral fins to the entire length, the situation of the dorsal, the number of scales both in the lateral line and above and below it, which I shall not now describe, as it is most probable Mr. Teale will minutely enumerate its distinctive characters ; in the meanwhile he has named it provisionally *leucophthalmus*.

Leuciscus Cephalus. Common.

Leuciscus Erythrophthalmus. Local. I know of only one locality (Campsall), which is rather beyond our distance.

———— *alburnus*. Local. Cawood, Tadcaster.

———— *Phoxinus*. Common.

Cobitis barbatula. Common.

Esox Lucius. Common.

Salmo Fario. Plentiful in the Wharf at Harewood, Bolton, &c.

—— *Salar*. Not uncommon. Cawood.

Osmerus Eperlanus. Occasionally plentiful. Cawood, Selby. On the 21st Dec. 1834, they were in such abundance that they were sold in Leeds market at twopence per pound.

Thymallus vulgaris. Rather local. Harewood, Bolton, Wakefield.

Chupea Harengus. I obtained a single example in 1834, taken at Cawood.

—— *alosa*. I purchased a specimen of this fish in the market for our Museum, which was said to have been taken at Tadcaster.

Lota vulgaris. Not uncommon near Selby.

Platessa limanda. Occasionally at Cawood.

APODES.

Anguilla acutirostris, latirostris. Tolerably plentiful.

CARTILAGINEI.

Acipenser latirostris. This appears to be the only species we have, which generally occurs every year at Cawood. Three or four fine fish were caught this summer, two of which were brought to Leeds alive.

CYCLOSTOMA.

Petromyzon fluviatilis. Occasionally. Killingbeck.

Before closing this sketch of the zoological localities of the neighbourhood, one spot must not be passed over without a few remarks, since the facilities which are there afforded for observing a variety of animals in a state of uncontrolled freedom are exceedingly valuable. Many interesting facts regarding the habits of the feathered tribes especially frequenting this spot have already been given to the world by the second White of Selbourne (as he has been emphatically termed) who owns the estate. This tract it will readily be perceived is Walton Park, near Wakefield, which owing to its construction, containing 260 acres of wood and meadow, and 24 acres of water, surrounded by a wall from 9 to 10 feet high, forms a rendezvous for all comers and goers of every tribe, terres-

trial or aquatic, including what are generally denominated vermin; so that whatever gains access to this city of refuge is safe from harm; for not only is security given, but it is the constant care of the kind-hearted and worthy proprietor, Charles Waterton, Esq., to provide for the comfort (so to speak) of such of his cotenants of this earth as seek for shelter by offering every inducement for them to fix upon the situations most suitable for their wants,—such as promoting the growth of ivy round the stems of large trees, fitting up hollow stumps with partitions and entrance-holes, and covering up the top to prevent the ingress of rain, in erecting pieces of masonry with holes of different dimensions to suit the various requirements of such as seek its concealment and security. Many interesting observations regarding the history of the inmates may be registered by such residences not otherwise easy to be noted; for instance, the number of mice, &c. destroyed by a pair of Owls, either while rearing their young or in a given time at any other period. Of these there are several families in Walton Park. This could be ascertained by dissolving the rejected masses of indigestible substances which contain the skeletons of their prey, and which may be readily collected in their dwellings, each of which contains, upon an average, the remains of six mice, shrews or campagnols, as I found by examining a supply of such masses given me by Mr. Waterton for that purpose. Walton Park is not merely a retreat for such as seek it, but many a poor unfortunate Hedgehog, &c. has been rescued by purchase from a cruel death by its amiable owner, and turned loose to end its days in peace. Indeed I know of no individual to whom the beautiful lines of Goldsmith might be applied with greater propriety than to him, who thus mercifully provides for the wants of that portion of the Creator's works which receive little else from mankind in general than persecution and abuse.

“ Here to the houseless child of want
My doors are open still.

"No lambs that range the valley free
To slaughter I condemn :
Taught by that Power which pities me,
I learn to pity them."

Walton Park is a zoological garden upon the most perfect plan, because the various tribes which resort there may be seen as such objects should be, truly wild (not in the general acceptation of the term), but in a state of ease and freedom, and apparent consciousness of security, following their different avocations without alarm, which confidence is acquired by the constant serenity and peacefulness of the region. No guns are ever allowed to be fired, nor any nests plundered, so that by such regulations the *real* habits of animals are seen in as it were their state of primæval simplicity, without the acquired fears and misgivings engendered by man's relentless persecution and cruelty; and strange to say, birds of reputed rapacious characters and habits, and those which are timid and harmless, building in the same tree. In 1833 a Wood-Pigeon built its nest four feet below that of a Magpie, and both lived in peace, and hatched their eggs, and reared their young. Here may be seen the motionless Heron waiting patiently for his meal; the Cormorant perched within a few yards of the drawing-room window eyeing the finny tribes in the lake; whole companies of Coots grazing on the lawn and cropping grass like geese, or flocks of Widgeon, Mallard, Teal, Pintail, &c. sailing on the smooth surface of the lake, which is now and then agitated by the diving of a Dabchick or the flutter of a Waterhen. While passing through Walton Park the visitor not only observes ornithological specimens alive and in motion, but also *full-sized pheasants made of wood* perched upon the upper branches of the trees, for the sole purpose of trying the skill, and still more the patience, of a class of persons who have a singular propensity for killing their neighbour's game on moonlight nights.

XLVIII.—*Appendix to Mr. SHUCKARD's Monograph of the Dorylidæ, containing a Description of two new Species of Labidus.*

SINCE the publication of the concluding portion of my Monograph Mr. Swainson has kindly furnished me from his Cabinet with two new species of the genus *Labidus*, captured by himself in the Brazils. The first would in size precede the *L. Halidaii*, and come into the same section with it, viz.

Sp. 3—4. *L. Illigeri*, Shuck.

Length 7 lines.

Expansion of the wings $15\frac{1}{2}$ lines.

Fuscus, subpubescens; *vertice, prothorace, extremitate mesothoracis, scutello, metathorace et pedunculi disco nigris.*

Reddish fuscous, with the vertex, the prothorax, excepting its lateral angles, the discal portion of the extremity of the mesothorax, the scutellum, metathorax and disk of the peduncle of the abdomen, black; head small, ocelli large and prominent, and disposed in a very open curve, with less than the diameter of one between the anterior and posterior; antennæ moderately long, setaceous, the scape very slightly thicker than the base of the flagellum, and about one-fifth its length; carinæ of the face comparatively slight and parallel, terminating gradually in front of the anterior ocellus; mandibles very slender and much curved, leaving but a small space between them and the clypeus.

Thorax very gibbous at the scutellum, and the metathorax abruptly perpendicular; wings hyaline, their nervures testaceous; the marginal cell considerably larger than either of the two first submarginals, lanceolate and slightly acuminate beyond the second submarginal, which is rather smaller than the first, from which it is separated by an undulated transverso-cubital, and has the recurrent nervure inserted at half its length, beyond which to the end of that cell the cubital nervure is considerably thickened; legs short and rather stout.

Abdomen slightly shining, its peduncle transverse-quadrate, the disk convex, scarcely so wide as the second, which to the sixth are short and transverse and slightly constricted; the terminal segment considerably vertically compressed at its extreme apex, and the sexual organ protruding beneath it in the form of two curved and tolerably compressed teeth, convex beneath.

In my own collection.

The proportions of the body of this insect are somewhat similar to those of the *L. Swainsoni*, but it is rather more robust, and differs from it in the neuration of the wings, colouring of the body, and other minute particulars; besides being much larger. I have dedicated it to the celebrated and talented Illiger, whose attachment to the Hymenoptera is conspicuous throughout all his entomological works.

The next species will immediately precede the *L. Klugii*, viz. *Har. Brug.*

Sp. 7—8. *L. Guerinii*, Shuck.

Length $5\frac{3}{4}$ lines.

Expansion of the wings 12 lines.

Fuscus subpubescens; *capite atro, scapo antennarum incrassato, et clypeo tuberculis binis acutis recurvis instructis.*

Dark fuscous, especially the thorax and peduncle of the abdomen: the head small, very black and shining: ocelli large, placed in a curve, and with less than the diameter of one between the anterior and

posterior : antennæ inserted higher than usual, setaceous ; the scape about one-fifth the length of the entire organ, very robust, being nearly twice as thick as the base of the flagellum, and curved slightly at its base ; the carinæ, behind which they are inserted, terminating above abruptly, in front of the anterior ocellus, where they are very prominent, and beneath the insertion of the antennæ dilating laterally and inclosing a large circular concavity, and terminating on the edge of the clypeus on each side in a recurved compressed acute tooth : mandibles slender, leaving scarcely any space between them and the clypeus.

Thorax excessively gibbous in front, pendent over the head ; metathorax perpendicular : wings rather darkly tinged, their nervures testaceo-fus-cous ; the stigma testaceous, with a minute brown spot at its base : marginal cell yellowish, lanceolate, slightly acuminate beyond the second submarginal, which is about the same size as the first, from which it is separated by an inwardly curved transverse cubital ; it receives the recurrent at about half its length, beyond which to the termination of the cell the cubital nervure is slightly thickened : legs short and rather stout.

Abdomen slightly shining and slightly laterally compressed ; its first segment transverse-quadrate, transversely convex at its apex, about as wide as the second, which with the following are transverse and short, and but slightly constricted at their margins, the terminal segment vertically much compressed at its extreme apex, beneath which the sexual organ protrudes as usual.

Hab. Brazil.—

In my own collection.

This species is amply distinguished from all by the peculiarity of the carinæ of the face, the clypeus, the remarkable thickness of the scape of the antennæ, and the excessive gibbosity of the mesothorax in front. I have much pleasure in dedicating it to Mons. Guerin, the able illustrator of many genera of Hymenoptera.

XLIX.—*Information respecting Botanical and Zoological Travellers.*

Neuchatel, June 12.—Recent accounts have been received from the naturalist Tschudy, who some years ago, assisted by the late King of Prussia and some other gentlemen with four thousand francs, went out with the Edmond to Lima, in order from thence to make excursions into the Cordilleras and adjacent country. A considerable transport of objects of Natural History collected for the Museum of our town (Neuchatel) has already come to hand. He is still in the mountains of Peru ; and having consumed the money taken out with him, lives by the chase, and is awaiting fresh assistance which

is on the way for him. He had much to suffer from hunger and want of shelter during the rainy season ; this however did not abate his zeal. His collection for our Museum has considerably increased ; for he announces 70 Mammalia, more than 500 Birds, Reptiles, Fishes, 1100 Coleoptera, 200 Lepidoptera, and a hundred Conchylia, with several other remarkable objects, plants and fossils. The assistance sent will enable M. Tschudy to embark with his rich booty, and return to his native country.—*Augsburg Allgemeine Zeitung*, June 19.

Mr. Schomburgk's recent Expedition in Guiana.

[Continued from p. 348.]

IN my former remarks I gave some account of the manners and habits of the Jabiru (*Mycteria Americana*), and alluded to two young ones which I received while in Georgetown. They were brought to me from the Pomeroon, and when keeping their neck erect they were about five feet high. Their plumage was still grey, and they might have been about a year old. They were so tame that I allowed them to run about the yard, to which, however, they did not restrict their perambulations, and they extended their walks frequently to the street. As they were a great curiosity, they had frequent visitors ; or when in the street, a crowd collected generally around them, until annoyed by too great familiarity, they would begin to clack the under chap against the upper, and partly spreading their wings, those unacquainted with the bird fancied these to be the first preparations for a formidable attack ; and the little knot of by-standers which had formed round opened their ranks without further contention, and allowed them to return leisurely to the yard.

I shall never forget the effect which the sight of them produced upon a woman of colour, who no doubt had never seen a Jabiru before. The woman with a tray on her head was walking down the street, when one of the Jabirus came with its measured step out of the gate. At the first sight of this gigantic bird she stared with half-open mouth at what she must have considered a monster ; at that moment the bird spread its wings to their full extent, and changing its leisurely step into a hop, it approached her rapidly : this was too much for her ; and throwing the tray upon the ground, she fled for protection as quick as her legs would carry her to the nearest shop, throwing together her arms during her rapid flight violently over her head. The ridiculousness of the scene cannot be described ; it must

have been seen to conceive it. I wished I had possessed the skill of a Cruikshank, in order to sketch it when yet fresh in my memory.

While they were in my possession I fed them on butcher's meat and the offals of the kitchen. They sometimes got fish, but its high price in Demerara did not permit me to feed them exclusively with it, although they appeared to prefer it to any other food. When the food was thrown in the air they caught it with great skill. They were very voracious, and would frequently quarrel with each other for a favourite piece.

When irritated they clacked their beaks violently, and partly spreading their wings, their appearance was certainly calculated to cause some precaution. I have seen them strike with their beak towards the face of those who irritated them; and in one instance a wound was inflicted, fortunately of no great moment. A dog stood no chance, as the clattering noise and their appearance was quite sufficient to frighten him away. In their wild state they are fierce; and I have seen them, although mortally wounded, defend themselves valiantly.

The season was too far advanced to send the two young Jabirus to Europe; and as I was on the eve of my departure to the interior, I gave them away, and am not acquainted with their fate.

All the pictures which I have seen of this bird are poor representations of it. It appears to be scarce in European museums; and the one which is preserved in the British Museum is not only in itself a poor specimen, but is besides so injudiciously stuffed, that it does not convey to the spectator any true resemblance of the bird in its natural state.

The representatives of the swine in South America are the banded or collared, and the white-lipped Peccari; but although their form of body, the length of the snout and the shape of their legs are not materially different from the European swine, there are nevertheless differences, even in the outer appearance, which become evident when we come to examine them nearer. Their body is not so bulky, the legs are shorter, in lieu of the tail there is merely a short protuberance; but the greatest difference consists in a gland upon its back, which although concealed, is easily perceptible from the turn of the hair around it, and which gland secretes a liquor of a strong smell. Both species appear to be common to Paraguay and Guiana. In the latter province, where they have come under my notice, they are seldom met with on the plains or savannahs, and frequent more the thick forests and swamps.

The collared or banded Peccari (*Sus Tajassu*, L., *Dicoteles torquatus*, F. Cuv.), the lesser of the two species, is generally met with in small families of eight or ten, frequently only in pairs. They are of a gray colour, that is, their hair, which is ringed alternately with black and yellowish white, appears gray at a short distance. The belly is almost bare, and the bristles on the sides are rather short, but they gradually increase in length as they approach the ridge of the back, where they form a kind of bristly mane. From the shoulders round the neck extends a narrow collar or band of whitish hair. Their legs are short and the hoofs long; they run nevertheless with great swiftness, and when hunted by dogs, take refuge in a hollow tree. They feed on seeds, particularly on those of different species of palms, which they crack with their strong jaws, and devour the shell as well as the kernel. They also turn up the soil like the domestic hog to search for worms or insects, and to procure them are often and more generally found in swampy situations: the assertions that they are only found in mountainous parts of a country, and very seldom in lowlands or marshes, may be correct with regard to Paraguay, but not so as to Guiana, where we have found them generally in marshy situations, wallowing like our domestic hogs in quest of worms. They bear one young at a time, rarely two, which follow the dam until it can provide for itself.

They swim across rivers, but seldom take to the water when pursued by dogs, as they do not dive. Indeed they are awkward in the water, and the Indian hunter is sure of success if he can drive a herd into the river. They are then easily killed by striking them a blow on the nose; however, the Indian does not stop to pick them up when thus killed; he is well aware of the peculiarity which they share with few animals, namely, that they float on the water, while almost every other animal sinks: the Indian therefore kills as many as he can, and picks them up when he is no longer able to add to their number.

When taken young they are easily tamed, and will follow any one they take a liking to, like a dog; but are apt to bite and snap at those to whom they take a dislike. They appear very fond of being scratched; and so pleasing must this operation prove to them, that they gradually lie down on the ground and give signs of their great delight by a low grunt. In a tame as well as in a wild state they show the greatest aversion to dogs; in a domesticated state their bristles rise and they begin attacking the enemy with their tusks. When hunted they make a desperate resistance, and severely wound dogs that are not accustomed to hunt them. Those which

have been trained by the Indians separate one from the herd and keep it at bay until the huntsman arrives to shoot it with his arrow ; the dog then sets off after the herd again and acts in like manner. I have known a hunter with a well-trained dog to bring three and four hogs as the fruit of his hunting excursion. The Indian who is not provided with a dog, on coming up with a herd climbs the first tree, and begins to imitate the barking of a dog ; if young ones should be among the herd, at which period they are particularly fierce, this sound is quite sufficient to urge them to attack, and they soon gather in numbers round the tree, threatening with their tusks. This is the time for the Indian to discharge among them the contents of his gun, if provided with one, and with what success may be imagined : off sets the herd in full flight ; the Indian is equally quick to follow them, and should he be nimble-footed enough to outstrip them and to get before the herd, he climbs another tree, and again imitating the barking of a dog, he is sure to assemble them in full rage around the tree, and has opportunity of firing a second shot at them. This method is now frequently practised, where guns, and even double-barreled ones, are no rarity among the Indians of the coast regions. An Arawak Indian from the Lower Essequibo nearly paid this *ruse* with his life ; the branch on which he sat when he was about to fire among the incensed herd which had gathered round the tree, broke, and he would have fallen among them if he had not caught one of the lower branches, not high enough however from the ground to be entirely out of their reach. His legs were almost literally torn to pieces by their triangular tusks ; still he did not let go his hold, and kept presence of mind enough to try to swing himself upon the branch, in which he at last succeeded. Their victim having escaped, they exhausted their ire on the gun, and at length left the Indian, who in spite of the loss of blood crawled homewards and escaped narrowly with his life.

Their flesh is savoury, though drier and leaner than that of the hog ; but precaution must be taken soon after the animal has been killed to cut off that part on the back which contains the glands, otherwise it communicates a musky taste to the meat. They form one of the chief articles of sustenance of the Indians ; and as their being hunted with a well-trained dog insures more certain success, a dog of that description commands a good price. The Peccari is called *APUYA* by the Arawak Indians, *PARAKA* by the Macusis, *PAKIRA* by the Paravilhanas, *PAKITYÉ* by the Warraus.

The white-lipped Peccari or Kairuni (*Dicoteles labiatus*, Cuv.) is considerably larger than the preceding, of a darker colour, and white

upon the cheeks and lips; and the hair about the head is so long that it almost covers the ears. The young are of a chestnut colour, and their cry resembles the bleating of a goat. Their manner of feeding and habits in general are not different from the Peccari, but they travel together in herds of several hundreds. They are more fierce when hunted, and often kill the dogs that attack them by ripping them up with their tusks; and they are also known to have attacked the huntsman. When they once take to flight they can be followed without much danger, as they seldom retain their courage or turn round upon their pursuers. The Jaguars commit great carnage among them; they remain generally in the rear and seize upon the last and all stragglers; but it is asserted by the Indians, and corroborated by wood-cutters and others who live in the interior, that the white-lipped Peccaris frequently surround the Jaguar and tear their enemy to pieces.

Of all the rivers in British Guiana, the Berbice offered the greatest difficulties to our ascent, either in the shape of cataracts or from large trees, which we frequently found lying across where the river narrowed, which either the wind or age had prostrated. Our advance amounted on the 2nd of January (1837) scarcely to two miles, the trees which barricaded our passage were so numerous. While we were thus engaged in cutting through a large mora-tree, one of the Indians who had been straying about, brought us information that a herd of the larger Peccari were feeding at a short distance from a river. Our guns were put immediately in requisition, and off we started.

Akuritsh, the Caribi, armed with bow and several iron-headed arrows, accompanied us. I came first up with the herd and found them in a pool of water, where they wallowed in the mire like the common hog. One stood apart apparently as watch; and scarcely had it perceived me, when the bristles on its back rose erect, and turning round towards me, it began chattering with its teeth, and the whole herd rose: not a moment elapsed, and it lay prostrated in the mud pierced by my rifle-ball. How can I describe the bustle and the rush of several hundred, which at the report of the gun were seen flying in the opposite direction! an Indian who had come up by this time shot another, and the retreat was now complete. I had loaded again, but hesitated to wade through the swamp, when the Arawak chieftain Mathias, who had observed my hesitation, requested me to lend him my rifle; I gave it him, and he started off, while I remained at the spot where I first fell in with them. I heard four or five shots fall, apparently at some distance, and while

I was yet considering how many of them might have told, I heard a rushing noise like a whirlwind approaching through the bushes towards the place where I stood: the peculiar growl and that awful chattering of the teeth, did not leave me long in doubt as to its cause; it was evident that the herd had divided and were coming directly towards me. I stood alone, unarmed; these were my last thoughts; the next image which stands fixed in my memory is, that I stood on the lower part of a mora-tree and looked down upon a herd of about fifty Kairunis rushing by in full speed, their rough bristles standing erect, their muzzles almost sweeping the ground, and their white triangular tusks clapping in concert. They came and passed like a whirlwind, and before I had recovered from my astonishment, I heard them plunge into the river to swim across. How I came on that tree I know not; to the rapid execution of what I must have considered my only means of escape I owed my life. The other hunters had not been so fortunate as I expected; excitement or fear made them miss, where it would have appeared almost impossible. Including the one which I had shot, three more had been killed with guns, and one by Akuritsh with bow and arrow: they were a most welcome addition to our reduced Commissariat.

I had never a better opportunity of watching their proceedings when on march than offered itself while traversing from the river Berbice to the Essequibo. We had fallen in with the herd and shot two, of which we took as much as we could carry, and continued our journey. A preconcerted signal called us shortly after back to our camp at the banks of the Berbice, where only a case of urgency could have induced those who were left in command to fire that signal. Anxious to learn the cause, I had distanced my party, and unaware and unperceived I fell in with the herd of the Kairunis; they were in regular line of march, and walked with slow step, though single, nevertheless so that the preceding covered partly the following; the young were walking under the belly of the mother. We shot two more, which as time did not permit to carry with us, we hung up on a tree, to send for them if circumstances permitted. A large party of Caribi Indians had arrived at the camp, which had been the reason of firing the signals for our return; they came, however, as friends; and we returned next day for our hogs, and were not a little astonished to see no vestiges of them. They had been carried away by a Jaguar. After some search we found them, however, dragged to a thicket, where they were yet untouched, and of course we put an end to any further question as to who should possess them. Their meat is justly esteemed, and many prefer

it to the lesser Peccari. The liquor which flows out of the gland is equally offensive as in the latter, and is peculiar to both male and female. They bear only two young ones, frequently only one; but they are more difficult to tame than the collared Peccari. I do not think that any attempts have been made to domesticate either one or the other species. The Indians tame sometimes the young ones, but never with the avowed purpose of breeding; although I have little doubt that their meat would vastly improve by regular attention; and after two or three generations they would be familiarized. There is no instance known of their having bred with the European hog and produced an intermediate race.

The white-lipped Peccari is equally indigenous at Paraguay as in Guiana. It is called KAIRUNI by the Arawaks, POINGÉ by the Macusis, IPURÉ by the Warraus.

Extracts from a Journal of the Mission which visited Bootan, in 1837-38, under Captain R. BOILEAU PEMBERTON. By W. GRIFFITH, Esq., Madras Medical Establishment.

[Continued from p. 211.]

April 10th. We descended to a small nullah just below the castle, and then commenced an ascent which lasted for three or four hours, and which was generally moderately steep. On surmounting the ridge, which was of an elevation of about 10,000 feet, we commenced a long and uninterrupted descent along the course of a small torrent (the path being well diversified with wood and glade) until we reached Woollookha, distant fourteen and half miles from Telagong. About 1200 feet above this we came on rather fine wheat cultivation, among which two or three villages were situated. Above this elevation we came on fine woods of oaks and yews, diversified with swardy spots; and on reaching the summit of the ridge an open sward with beautiful rhododendron, birch, and juniper woods. Herbaceous monocotyledons abounded here; in fact the vegetation altogether was very rich, and the first spring vegetation we had yet met with. Gooseberries and currants were common from 9000 feet upwards: euphorbias, primroses, saxifrages, clematises, anemones, ranunculuses, &c., were some among the many European forms that I met with on this march. Near the summit, on the descent, a genuine larch was observed, and lower down two species of poplar were very common. The scenery was generally very beautiful. We passed a delightfully situated Gylong village not much below the summit, and near Woollookha saw Symtoka, a rather large square building

belonging to the Deb Rajah, situated two or three hundred feet above our road. Woollookha is a good-sized village, and the houses are very good: it is close to the river Teemboo, which drains Tassisudon valley, a few miles distant to the north. There are several villages around it, and a good deal of cultivation of alternating crops of barley, wheat, and rice. The valley, if indeed it can be so called, for it is very narrow, is picturesque enough, although the surrounding hills are not well wooded. The banks of the river, which here flows gently enough, are well ornamented with weeping willows.

11th. We continued our route following the river, the path generally lying down its bed, or close to it, occasionally ascending two or three hundred feet above it. Halted at Lomnoo, an easy march. The features of the country remained the same until we neared our halting-place, when woods of *Pinus excelsa* became very common; roses occurred in profusion, and the vegetation generally consisted of shrubs; villages were tolerably frequent, and the cuckoo* was again heard.

12th. To Chupcha. Continued for some time through a precisely similar country, still following the river, but generally at some height above its bed. After passing Panga, a small village at which our conductors wished us to halt, although it was only six miles from Somnoo, we descended gradually to the river Teemboo, and continued along it for some time, during which we passed the remains of a suspension-bridge. After leaving Panga no villages were passed, and one small one only was seen on the opposite bank of the Teemboo; but up to the above-mentioned place the country continued tolerably populous. The vegetation, until the ascent was commenced, was a good deal like that about Somnoo, *Pinus excelsa* forming the predominant feature. From the base of the ascent it became completely changed—oaks forming the woods, and from 7500 feet upwards, various rhododendrons occurring in profusion, mixed with wild currants, &c. We were detained at Chupcha for two days, at the end of which the last coolies had scarcely arrived: it is ten miles from Somnoo, and sixteen miles from Panga, and about 8100 feet in elevation. The greatest ascent, and this too after a march of twelve miles, must have been between 2500 and 3000 feet. We were lodged comfortably in the castle, although it was not white-washed, nor had it the insignia of a belt of red ochre. It is a short distance from the village, which again is two or three hundred yards to the

* The first time I heard this bird was about Punukka. Although in plumage it differs a good deal from the bird so well known in Europe, yet its voice is precisely similar.

west of the direct road. We thought Chupcha a delightful place : the scenery is varied, the temperature delightful, varying in-doors from 46° to 52° . The face of the mountain, although very steep, is about the castle well cultivated : the crops, which were of six-ranked barley, were very luxuriant, and certainly the finest we ever saw in the country. The red-legged crow recurred here. During our stay, I ascended the ridge immediately above the castle, passing through a very large village of Gylongs, elevated at least 9000 feet. This village was the largest I saw in Bootan, and was ornamented with a pretty religious building, surrounded by junipers, and more decorated than such edifices usually are. Up to the village the path passed through beautiful woods of *Pinus excelsa* : above it I came on open sward, which continued on the south face up to the very summit of the ridge, which was nearly 11,000 feet. The north face of the mountain was well wooded : on it rhododendrons, a few black pines, beautiful clumps of *Pinus Smithiana*, bogh pat, mountain pears, aconites, columbines, saxifrages, primroses, &c. were found in abundance. The southern face was decorated with a pretty yellow anemone, and the pink spikes of a bistort. From the ridge still loftier ones were visible in every direction, all of which were covered with snow, which lightly sprinkled the one on which I stood. At this season snow scarcely remains for a day under 11,000 feet, except in very sheltered situations.

15th. I left Chupcha with much regret. We descended by a precipitous path to a torrent about 1800 feet below the castle. Crossing this, we descended gradually until we came on the ravine of the Teemboo ; at which point there is a small pagoda, visible from Chupcha. We then turned southwards, and continued for a long time at nearly the same level, passing a small village, Punugga, three or four hundred feet below us. The march was seventeen miles. The road in many places was very bad, and scarcely passable for loaded ponies. The scenery was frequently delightful, and vegetation was in the height of spring luxuriance. The hills bounding the ravine of Teemboo continued very high until we reached Chuka ; they were well diversified, particularly at some height above us, with sward and glade, and richly ornamented with fine oaks, rhododendrons, cedar-like pines, and *Pinus excelsa*. Water was most abundant throughout the march, and in such places the vegetation was indescribably rich and luxuriant. No village besides that of Punugga was passed or seen, nor did I observe any cultivation. I was much impeded by droves of cattle passing into the interior, for the road was frequently so narrow, and the mountains on which it was formed

so steep, that I was obliged to wait quietly until all had passed. These cattle were of a different breed from those hitherto seen in Bootan, approaching in appearance the common cattle of the plains, than which however they were much finer and larger. We were sufficiently well accommodated in the castle of Chuka. There is a miserable village near it, and several trees of the *Ficus elastica*.

16th. To Murichom. We descended to the Teemboo, which runs some fifty feet below the castle, and crossed it by a suspension-bridge, of which a figure has been given by Capt. Turner; it is very inferior in size and construction to that of Rassgong, although, unlike that, it is flat at the bottom. We continued following the Teemboo winding gradually up its right bank, chiefly through rather heavy jungle, and descending subsequently about 600 feet to its bed, by a dreadfully dangerous path, built up the face of a huge cliff. We continued along it until we crossed a small torrent at its junction with the large river, and then ascended gradually, following the ravine of this through humid jungle. As we approached Murichom we left the Teemboo a little to our left, and continued through a heavily wooded country. Before ascending finally to Murichom, we descended twice to cross torrents. We reached Murichom late in the evening, the distance being eighteen miles. No villages were seen until we came in sight of Murichom. The mountains were much decreased in height, and clothed with dense black jungle. We passed two water-falls, both on the left bank of the Teemboo, the one most to the south being the *Minza peeya* of Turner. Neither of them appeared particularly worthy of notice. The vegetation had almost completely changed, it partook largely of the subtropical characters, scarcely a single European form being met with. Murichom is a small village, rather more than 4000 feet above the sea. Although at so considerable an elevation, most of the plants were similar to those of Assam.

17th. Leaving Murichom we descended rapidly to a small torrent, from which we re-ascended until we had regained the level of Murichom. The path then wound along through heavily wooded country at an elevation of 4000 or 4200 feet; we continued thus throughout the day. At five P.M. finding that the coolies were beginning to stop behind, and failing in getting any information of my companions, I returned about $1\frac{1}{2}$ mile to the small village of Gygoogoo.

18th. I proceeded to Buxa. The path was somewhat improved, and the ascent gradual until an elevation of about 5500 feet was surmounted, from which the descent to Buxa is steep and uninterrupted. This place is seen from a ridge about 1200 feet above it. I reached

it between 9 and 10 A.M., and found that my companions had arrived late on the preceding evening, having accomplished a march of twenty miles in one day. Scarcely any coolies had arrived, however, before me. The features of the country remained the same, the whole face being covered with dense black-looking forest. Even on the ridge, which must have been between 5000 and 5500 feet in elevation, scarcely any change took place. As I descended to Buxa vegetation became more and more tropical, and on reaching it I found myself surrounded with plants common in many parts of the plains of Assam*. Captain Pemberton left Buxa a day before me, as I was detained behind for coolies, none of whom had yet arrived. On the following day I rejoined him at Chicha-cotta. The descent to the plains is steep at first, and commences about a quarter of a mile from Buxa. On reaching the steep portion, a halting-place, called Minagoung, is passed, at which place all bullocks, which are here used as beasts of burden, are relieved if bound to Buxa, or provided with burdens if bound for the plains. The descent from this place is very gradual, and scarcely appreciable; the path was good, and bore appearances of being tolerably well frequented: it passed through a rather open forest, low grasses forming the under-plants. The plains were not reached for several miles; indeed the descent was so gradual, that the boundaries of the hills and those of the plains were but ill-defined. At last, however, the usual Assam features of vast expanses of grassy vegetation, interrupted here and there with strips of jungle, presented themselves. The country is very low, entirely inundated during the rains, and almost uninhabited. Saul occurred toward that which may be considered the Toorai of these parts, but the trees were of no size. To Koolta. We continued through nearly a desolate country, overrun with coarse grasses, until we came on the river, which is of considerable width, but fordable: we now found ourselves in the Cooch-Bihar territory, and were much struck with the contrast between its richly cultivated state, and the absolute desolation of that belonging to Bootan. We continued traversing a highly fertile country, teeming with population, until we reached those uncultivated portions of Assam, that are so frequent in the immediate vicinity of the Brahmaputra. At Rangamutty, where we received every civility from the Bhoorawur, we took boat and arrived at Goalpara.

Beyond this it is scarcely necessary to trace our progress. I have only to add, that but one death occurred during the time that the Mission was absent.

* Plantains, jacks, mangoes, figs, oranges, &c. are found about the huts of Buxa.

BIBLIOGRAPHICAL NOTICES.

A History of the Fossil Fruits and Seeds of the London Clay. By James Scott Bowerbank, F.G.S., &c. With numerous Engravings. Part I. London, Van Voorst, price 16s.

We have here a work, which if carried through as it has been begun, cannot fail to be of the highest interest and utility to the geologist and the botanist. An extract from the Prospectus will best explain what the author has undertaken, and the manner in which he proposes to execute it.

“ Among the numerous and highly interesting fossils found in the London clay, none are more abundant than the remains of fruits and seeds, which, although occurring in such amazing quantities in the Isle of Sheppey, have hitherto received but little attention from geologists, and consequently present a wide field for inquiry and research.

“ For many years past the author of the present work has made these interesting remains his peculiar study ; and during this period there have passed through his hands more than 120,000 fruits and seeds, from which he has selected about 25,000 specimens. He proposes to publish figures and descriptions of as many of the species as can with certainty be determined ; and, as a guarantee for the accuracy of the delineations, he considers it will be sufficient to announce that the whole of the drawings and engravings will be executed by Mr. James De Carle Sowerby.

“ In these beautiful remains of an extinct Flora, the minute and delicately-formed vegetable tissues are preserved in the most perfect manner ; and it is part of the Author's plan to give numerous highly magnified illustrations of the anatomical structure, as well as of the external form.”

It is obvious that the value of such a work must greatly depend upon the execution of the figures. Lest we should therefore fail in conveying to our readers an adequate idea of the force and accuracy of the engravings, we have obtained the favour of the impressions of Plate IV. which accompany our present number, and which may serve to illustrate what we shall extract relative to Mr. Bowerbank's first group, *Nipadites*, and the interesting species which it represents, *Nipadites Parkinsonis*.

“ The fruits of which this group is composed are found in considerable abundance on the beach at Sheppey, forming a portion of the organic remains impregnated with *pyrites*, so plentifully discovered there. They are known among the women and children, by whom they are usually collected, by the name of Figs. The epicarp and endocarp are thin and membranous ; the sarcocarp is thick and pulpy, composed of cellular tissue, through which run numerous bundles of vessels. The cells are about the eight hundredth part of an inch in diameter. Nearly in the centre of the pericarp is situated

a single large seed. (See Plate IV. fig. 2. *a*.) This, when broken, is usually found to be more or less hollow. It is frequently not more than half a line in thickness, but in the more perfect specimens it generally presents the appearance of a close, granulated structure, in which small apertures, containing carbonaceous matter, occasionally occur. These apertures possess much uniformity, both in size and shape, and are of about the same dimensions as the cells of the sarcocarp. This seed in one species, *Nipadites Parkinsonis*, when in the most perfect state of preservation, was found to consist of regular layers of cells, radiating from a spot situated near the middle of the seed, and apparently enclosing a central embryo."

"One very fine fruit of a species of *Pandanus* in the possession of my friend Mr. Ward, which is nearly four inches in length and two inches and a half mean diameter, approaches very nearly in external form to the fossil *Nipadites Parkinsonis* (Plate IV.), excepting that instead of being terminated somewhat acutely, like the fossil alluded to, it is depressed at the apex, and has eleven umbones, which are nearly equidistant from each other. Upon making a transverse section of this fruit at about its middle, eleven embryos were seen, arranged exactly in the manner indicated by the umbones at the apex of the fruit, and passing nearly in straight lines from that point towards its base. The cells containing the embryos were about the eighth of an inch in diameter."

"But of all the fruits that I have yet seen, there are none which approach so nearly to the fossil *Nipadites* as one of which my friend Mr. Ward has lately received two specimens from Captain Roberts, of the ship *Indemnity*, who met with them floating in the sea off the island of Java, at the mouth of a small river. These fruits my friend Mr. G. Loddiges recognized as the seed-vessels of *Nipa fruticans*."—"In their disposition and general character they very nearly resemble the corresponding parts in several species of our fossil *Nipadites*, especially *Nipad. umbonatus*."—"The epicarp is thin and smooth, and furnished near the apex of the fruit with numerous puncta, strongly resembling, both in form and extent, those occurring near the apex of the fruit figured in Plate IV. fig. 3."

The *Nipa fruticans* occurs, it is stated, "at the mouths of rivers in the Philippines and Molucca islands, especially in Ternate, and likewise in the Celebes. The tree grows in places within the influence of the tides. The fruits are often carried by the tide, and thrown on shore in distant places; and they take root where the soil is suitable. If the habits of the plant which produced our fossil fruits, as is justly observed by the Author, were similar to those of the recent palm just described (and it is highly probable that such was the case), it may account for their amazing abundance in the London clay.

"The resemblance existing between the whole of the species of *Nipadites*, both as regards their external form and their internal structure, with those of *Nipa*, is so close as to leave scarcely a doubt of their being members of

the same genus; the only difference being that the recent fruit has the interior surface of the pericarp somewhat in a state of induration, which is not perceptible in that of any of the fossil species; although it may have been so to a considerable extent in their original state, before fossilization, without our being able, at this period, to determine such to have been the case with any degree of certainty. And when we take into consideration the great variation in different species in the degree of thickness of the bony endocarp of the nearly allied genus *Cocos*, we can scarcely consider this single discrepancy sufficient to remove the fossil from the recent genus. I have therefore thought it advisable to reject M. Adolphe Brongniart's name of *Pandanocarpum*, and to apply that of *Nipadites*, as more expressive of their true relation to their recent analogues."

We may also remark, that several of the *Cupressinites* present a striking resemblance to the fruits of certain species of the Coniferous genus *Callitris*, principally confined to New Holland and Van Diemen's Land; and one, *Cupressinites curtus* (pl. x. fig. 20.), exhibits a close analogy with the fruits of *Callitris quadrivalvis* from Mount Atlas, being the only recent species in the Northern hemisphere.

The author is entitled to great praise in undertaking the illustration of one of the most difficult and important departments of fossil botany; and we trust that he may be encouraged to continue his researches in a subject so replete with interest, and in the prosecution of which he has already displayed so much zeal and ability.

British Entomology; being Illustrations and Descriptions of the Genera of Insects found in Great Britain and Ireland: containing coloured Figures from Nature of the most rare and beautiful species, and in many instances of the Plants upon which they are found. By John Curtis, Esq., F.L.S., Hon. M.A.S. Oxf., Acad. Imp. Georg. Florent. Soc., Acad. Sc. Philad. Corresp. In 16 vols. Royal 8vo.

In recording the completion of a beautiful and valuable work which is the fruit of sixteen years' unremitting labour, devoted to it by one who has combined accurate scientific research with consummate skill as an artist, and has at the same time borne for that long period all the anxiety, risk, confinement, and labour of regular publication, it is impossible not to enter with cordial interest into the feelings of the author, in his retrospect of what he has endeavoured, with the most laudable perseverance, to accomplish for natural history.

Mr. Curtis reminds us in the Preface which accompanies the final Number, that his *British Entomology* was begun on New Year's day, 1824, and he felicitates himself in having been enabled to complete it in the time which he then anticipated. His original design

had been an Illustrated "Genera of Insects;" but the vast increase of materials induced him, on commencing his work, to limit it to the Genera of British Insects. His views of the utility of such an undertaking are thus expressed:—

"That the investigation of genera must be of the first importance cannot be denied, for without a knowledge of such groups, it is impossible for any one to gain a correct knowledge of species; as well might a person expect to be able to write before he had learned the first rudiments of a language, or to solve a problem, being ignorant of the principles of mathematics. If this be admitted, it is unnecessary to dwell much upon the importance of having genera *correctly* investigated and described. This has been attempted in the present undertaking, and although I have selected the works of my lamented friend Latreille as a model, Nature has been my guide; for with the exception of some of the caterpillars, living examples of which it was impossible to obtain, and a very few of the dissections, every figure has been drawn from the life or from preserved specimens, and the descriptions have been taken from actual investigations of the various parts of the animals."

As to system and arrangement, Mr. Curtis differs from those who have founded them solely upon one set of characters, employed almost to the exclusion of all others; alleging that, although in different Orders their value essentially varies, "a truly philosophic system must be based on all that are available, and which consequently must be derived from various sources."

With regard to the scope of his work, Mr. Curtis adds,

"I have studied to give one or more examples, sometimes amounting to forty of each family, never losing sight of the Linnæan and Fabrician genera, all of which, I believe, as far as native groups are concerned, have been illustrated, and also a very large portion of the genera of other eminent authors, especially of Latreille, Olivier, Schönherr, Leach, Dejean, Gravenhorst, Kirby, Jurine, Hübner, Treitschke, Germar, Fallen, Meigen, and most of the new and remarkable types that have been discovered during the last twenty years."

Mr. Curtis has called in the aid of Botany in order to give additional interest to his Plates, each of which contains, along with the insect which is the subject of it, the representation of a British plant,—often that upon which the insect is found.

"The value also of correct figures of wild specimens of our *native plants* to the entomologist, as well as the beauty which they must always give to a drawing, have made me very desirous to render this department as interesting and useful as I could; and through the generous contributions of numerous friends and my own exertions, I am happy to find that this portion of the work is not viewed with indifference, even by botanists."

"It was not from choice but necessity that the work was not published in Systematic order," as it would have been impossible "to command the requisite materials, so that the work should appear with strict regularity;" Mr. Curtis, however, observes, that

"one great advantage undoubtedly attended the miscellaneous plan adopted, namely, that a *variety* of orders was monthly presented to the public, which led to their immediate attention, and thus families became the favourites of entomologists, which frequently had been up to that period totally neglected."

The work, however, being now completed, the requisites for a Systematical arrangement have been carefully supplied in the concluding Number, with which are given general systematical and alphabetical indexes both of the insects and plants; and eight separate indexes, of the same kind, together with as many new Title-pages, in order that the work may be bound in eight instead of sixteen volumes. It is unnecessary for us to remark how much the utility and interest of the work will be increased when thus arranged.

Mr. Curtis makes the following remarks upon the progress and execution of his labours:—

"Notwithstanding all difficulties, and they have neither been few nor trifling, I have devoted myself most assiduously to my task during its progress, that no delay might take place in the accomplishment of an object which I considered would be for the benefit of science; and for sixteen years my cabinets and library have been open to my friends and scientific men one day in each week, in the hope that my favourite pursuit would be thereby advanced; and if they have gained information or derived advantage from this arrangement, I am well satisfied. This, however, caused so great a diminution of my time, that it would have taken upwards of twenty years to complete this work, without allowing any periods for relaxation, if I had not called in the aid of artists to assist me in the engravings; I wish it, however, to be understood that the plates of several of the early volumes were for the greater part, and those of the last and a considerable portion of the fifteenth were entirely, my own engraving, and all the others were corrected and finished by myself; the drawings also are the efforts of my pencil, and the articles and descriptions are my own writing; for any errors, therefore, I alone am accountable. That my labours have been well received by those who are impartial judges, I need only refer to the notices of Latreille, Burmeister, and many of my own countrymen.

Before taking leave of those who have been interested in my undertaking for so many years, I would remark, that without the support of the influential and wealthy, no illustrated work with numerous highly-finished engravings can, in this branch of natural history, leave any reward for the labours of the author, which are of course greatly increased when he combines the part of the artist with his more legitimate duty; and if in the

present instance I had been compelled to pay for the drawings and all the copper-plate engravings, it would have caused an additional expense of at least twenty shillings per volume to the purchaser."

"If experience alone can teach us wisdom in the common affairs of life, with which we are familiar, how much more probable is it, that in the progress of enterprises and speculations with which we are totally unacquainted, we should meet with disappointments, and often be taught a lesson we little expected! such has been my fortune.—I had little idea of the large sum of money that would be required to carry on an illustrated publication, containing several hundreds of highly-finished coloured engravings; of the incessant labour and anxiety which a periodical would entail upon me; of numerous minor difficulties to which an author is exposed in the different stages of his work, and the little encouragement given to expensive works of art;—these have rendered the British Entomology a heavy tax for many years, and I have only been encouraged in my progress, by a desire to fulfill my promise to the Subscribers, and with the prospect of making it generally useful to those who are engaged in scientific pursuits. I now trust that the attention which has been paid to every department will recommend this work to those who have withheld from purchasing it, from their avowed and just objection to taking publications in numbers; and as it will, I trust, become the basis for a well-grounded knowledge of insects, I may anticipate some remuneration from other sources. It is also most earnestly hoped that those Subscribers who have discontinued taking the work, will now do me the justice to complete their copies, without which I must be subjected to great loss, and their own volumes will be of no value after a short period, as the stock is in the course of being perfected by reprinting the deficient parts."

We sincerely hope that the work, having been now brought to its completion, in a style of uniform and first-rate excellence as to its illustrations, and of the highest utility as regards the plan and execution of the descriptive and scientific part, may ultimately be found not wholly to disappoint the just expectations of the author.

PROCEEDINGS OF LEARNED SOCIETIES.

MICROSCOPICAL SOCIETY OF LONDON.

At a meeting of the Microscopical Society on Tuesday the 20th of May, Mr. Dalrymple read a paper upon the family of *Closterina*, which have been classed by Ehrenberg* amongst the polygastric Infusoria, and by Meyen amongst Confervæ or aquatic vegetables.

The author, after detailing the history of *Closterium* from its discovery by Coste in 1774 down to the present time, entered into a detail of its appearance and general structure; he described

* See Ann. Nat. Hist. vol. ii. p. 121.

it as consisting of a green gelatinous and granular body, invested by a highly elastic and contractile membrane, which is attached by variable points to a hard siliceous shell, which was afterwards stated by Mr. C. Varley to resist even the action of boiling nitric acid. The form of *Closterium* is spindle-shaped, or crescentic—the shell consisting of two horns, tapering off more or less to the extremities, and united at the central transverse line—constituting a perfectly symmetrical exterior. At the extremity of each horn is an opening in the shell, which, however, is closed within by the membranous envelope, wanting, however, in some specimens. Within the shell, and at the extremity of the green body, is a transparent chamber, containing a variable number of active molecules, measuring from the 20,000th to the 40,000th of an inch; these molecules, or transparent spheroids, occasionally escape from this chamber, and circulate vaguely and irregularly between the periphery of the gelatinous body and the shell; further, the parietes of this chamber have a contractile power. The author denied the existence of any papillæ or proboscides at this part, as well as the supposition of Ehrenberg that these moving molecules constitute the basis of such papillæ. He also denied the statement of the same distinguished observer, that if colouring matter was mixed with the water in which the *Closterium* resides, any motion was communicated to the particles of such colouring matter by the supposed papillæ, or by the active molecules within the terminal cells. A circulation of the fluids within the shell was observed, independent of the vague movements of the active molecules; this was regular, passing in two opposite currents, one along the side of the shell, and the other along the periphery of the gelatinous body. When the shell and body of the *Closterium* was broken by pressure, the green gelatinous matter was forcibly ejected by the contraction of the membranous envelope.

The action of iodine upon the specimens was very remarkable; 1st, it did not, as reported by Meyen, stain the green body violet or purple, but orange-brown; 2nd, it produced violent contraction of the investing membrane of the body, whereby the green matter was often forcibly expelled from the shell at the transverse division; it instantly annihilated the motion of the molecules in the terminal sacs, and the sacs themselves became so distended with fluid as to burst, and allow the molecules to escape.

The mode of reproduction was stated to take place, 1st, by spontaneous transverse division; 2nd, by ova; 3rd, by interbudding, or the conjugation of two *Closteria*.

The author, after balancing the arguments of the two theories respecting the classification of this body, gave as his reasons for retaining them on the side of the animal kingdom, the following summary :—

1st. That while *Closterium* has a circulation of molecules greatly resembling that of plants, it has also a definite organ, unknown in the vegetable world, in which the active molecules appear to enjoy an independent motion, and the parietes of which appear capable of contracting upon its contents.

2nd. That the green gelatinous body is contained in a membranous envelope, which, while it is elastic, contracts also upon the action of certain re-agents, whose effects cannot be considered purely chemical.

3rd. The comparison of the supposed ova with cytoblasts and cells of plants, precludes the possibility of our considering them as the latter, while the appearance of a vitelline nucleus, transparent but molecular fluid, a chorion or shell, determines them as animal ova. It was shown to be impossible that these eggs had been deposited in the empty shell by other infusoria, or that they were the produce of some entozoon.

4th. That while it was impossible to determine whether the vague motions of *Closterium* were voluntary or not, yet the idea the author had formed of a suctorial apparatus, forbade his classing them with plants.

Lastly, in no instance had the action of iodine produced its ordinary effects upon starch or vegetable matter, by colouring it violet or blue, although Meyen asserts it did in his trials.

The author therefore concluded that *Closterium* must still be retained as an Infusory Animal, although it is more than doubtful whether it ought to rank with the polygastric families.

ZOOLOGICAL SOCIETY.

November 26, 1839.—William H. Lloyd, Esq., in the Chair.

An extensive collection of shells, sponges, &c., presented by J. B. Harvey, Esq., Corr. Memb. Zool. Soc., was exhibited. The specimens contained in this collection are from South Australia, and were principally collected in Kangaroo Island.

Prof. Rymer Jones called the attention of the Meeting to certain specimens contained in this collection, and to the sponges in particular, and, having made some observations upon their structure and mode of reproduction, he entered into the question relating to their animal or vegetable nature.

Mr. Waterhouse laid before the Meeting the following tabular view of the distribution of the *Rodentia* :—

		Europe and North Asia.	North America.	Africa.	India and Islands.	South America and West Indian Islands.
MURINA.	<i>Sciuride.</i>	5. Sciurus. 1. Pteromys. 1. Tamias. 3. <i>Spermophilus</i> . 2. <i>Arctomys</i> .	20. Sciurus. 3. Pteromys. 5. <i>Tamias</i> . 10. <i>Spermophilus</i> . 8. <i>Arctomys</i> . 1. <i>Aplodontia</i> .	5. Sciurus. 3. Xerus.	25. Sciurus. 9. Pteromys.	6. Sciurus.
	<i>Muride.</i>	3. <i>Myoxus</i> . 8. <i>Dipus</i> . 16. <i>Mus</i> . 6. <i>Cricetus</i> .	2. <i>Meriones</i> . 6. { <i>Mus</i> . <i>Hesperomys</i> .	2. <i>Graphiurus</i> . 3. <i>Myoxus</i> . 4. <i>Dipus</i> . 10. <i>Mus</i> . 2. <i>Dendromys</i> . 6. <i>Gerbillus</i> . 1. <i>Psammomys</i> . 3. <i>Euryotis</i> .	12. <i>Mus</i> . 2. <i>Gerbillus</i> . 1. <i>Phlæomys</i> . 2. <i>Rhizomys</i> .	30. { <i>Mus</i> . <i>Hesperomys</i> . 3. <i>Reithrodon</i> .
	<i>Arviculide.</i>	1. <i>Castor</i> . 20. <i>Arvicola</i> . 4. <i>Lemmus</i> . 2. <i>Spalax</i> .	1. <i>Castor</i> . 1. <i>Ondatra</i> . 8. <i>Arvicola</i> . 4. <i>Lemmus</i> . 10. <i>Geomys</i> .			
	<i>Hystri- cide.</i>	1. <i>Hystrix</i> .	1. <i>Erethison</i> .	1. <i>Hystrix</i> . 1. <i>Aulacodus</i> . 1. <i>Orycterus</i> . 4. <i>Bathyergus</i> . 1. <i>Petromys</i> .	1. <i>Hystrix</i> . 1. <i>Atherura</i> .	3. <i>Cercolabes</i> . 2. <i>Syntheres</i> .
HYSTRICINA.	<i>Octo- dontide.</i>					3. <i>Capromys</i> . 1. <i>Myopotamus</i> . 10. <i>Echims</i> . 6. <i>Nelomys</i> . 1. <i>Cercomys</i> . 2. <i>Dasyprocta</i> . 1. <i>Cælogenys</i> .
	<i>Chin- chillide.</i>					2. <i>Ctenomys</i> . 1. <i>Poepthagomys</i> . 1. <i>Octodon</i> . 2. <i>Abrocoma</i> .
	<i>Caviide.</i>					1. <i>Chinchilla</i> . 2. <i>Lagotis</i> . 1. <i>Lagostomus</i> .
	<i>Leporide.</i>	5. <i>Lepus</i> . 3. <i>Lagomys</i> .	15. <i>Lepus</i> . 1. <i>Lagomys</i> .	6. <i>Lepus</i> .	4. <i>Lepus</i> . 1. <i>Lagomys</i> .	1. <i>Lepus</i> .
		81 spe. 16 gen.	99 spe. 19 gen.	53 spe. 16 gen.	58 spe. 10 gen.	89 spe. 25 gen.

Mr. Waterhouse stated, that in the construction of this table he had endeavoured to display the geographical distribution of the sections of the order *Rodentia*, and that to accomplish this, it of course became necessary to combine some system of classification, with an arrangement of the genera according to the countries in which they were found. The table is divided into five columns, one column being devoted to each of the following portions of the globe: 1st,

Europe and North Asia; 2nd, North America; 3rd, Africa; 4th, India and the Indian Islands; 5th, South America and the West Indian Islands.

In these columns the names of the genera found in each province are inserted, and the number of known species belonging to each genus (as nearly as can be ascertained) is also indicated. Horizontal lines separate the genera according to the sections to which they are supposed to belong.

“The few Rodents found in Australia all belong to the family *Muridæ*. About six species are known, and these appertain to the genera *Mus*, *Hapalotis*, Licht. (which is the *Conilurus* of Mr. Ogilby), *Hydromys* and *Pseudomys*.

“The first thing that strikes the attention,” observed Mr. Waterhouse, “is, that the great mass of South American Rodents belong to a different section from those of the northern portions of the globe, and that they are of a lower grade of organization, as is also the case with respect to the Old and New World Monkeys.”

The next point to which Mr. Waterhouse drew attention was the relative number of species found in warm and in temperate climates. “If the number of species found in the two provinces, Europe (including North Asia) and North America, be added together, the total is 180 species, whilst in all the rest of the world, taken together, the amount is only 206; and if from this last number those species which inhabit the temperate portions of South America and Australia (amounting to about 30) be deducted, and added to the first amount, it would appear that the Rodents are most abundant in temperate regions. In the Mammals of large size the case is reversed.

“The total number of species inhabiting each of the provinces pointed out in the table varies less than perhaps might be expected. The European province, North America, and South America, are nearly equal as to the number of species they contain; India and Africa are also nearly equal, but they contain fewer species than either of the other provinces.

“The Squirrels, Rats, Porcupines, and Hares (constituting the genera *Sciurus*, *Mus*, *Hystrix*, and *Lepus*), are the only groups which are found in all the provinces.

“The *Sciuridæ* abound most in North America and India, and are least abundant in Africa and South America. In the latter country they appear to be chiefly confined to the northern portions, and are totally wanting in the southern.

“The *Muridæ* are about equally abundant in Europe, Africa, and

South America; in North America and India they are much less numerous.

"The *Arvicolidae* appear to be confined to North America and the European province. In South America they are apparently replaced by the *Octodontidae*, *Chinchillidae*, and *Caviidae*.

"The family *Leporidae* is but feebly represented in each of the provinces above-mentioned, excepting in North America, where the number of species already discovered is almost equal to all those found in other portions of the globe taken together. In earlier periods, these Rodents, which are very low in the scale, appear to have been much more numerous, judging from the fossil remains which have been found,—at least in the European province.

"The remaining families of Rodents are almost entirely confined to South America. The genus *Aulacodus* of Western Africa, the genera *Petromys*, an inhabitant of the Cape of Good Hope, and *Bathyergus*, found both at the Cape and north-east portions of Africa, possess certain characters in which they approach the South American forms. *Petromys* analogically appears to represent the Octodons of South America, and *Bathyergus* may be compared to the genera *Poephagomys* and *Ctenomys*; whilst in *Aulacodus* we possess a representative of the *Capromys* of the West Indies."

Mr. Waterhouse observed "that he had not yet been able to satisfy himself as to the precise situation, in a systematic classification, of the genera *Ctenodactylus* and *Helamys*, the former from North, and the latter from South Africa. Four other genera are omitted in the above table for the same reason; they are, *Otomys** of Dr. Smith, a genus found at the Cape of Good Hope; *Akodon*, Meyen, which inhabits Peru; *Heteromys*, Desmarest, founded on the *Mus anomalus* of Thompson, an animal found in the island of Trinidad; and lastly, *Sacomys* of F. Cuvier, which is supposed to be from North America. These four genera in all probability belong to the family *Muridae*.

"The genus *Aplodontia* is placed with the *Sciuridae*, but it must be observed that it differs much from the typical species of that group, there being no post-orbital process to the skull, and the molar teeth being rootless.

"The remains of Rodents found in a fossil state indicate that the different provinces were formerly inhabited by the same forms as those which are now found in them."

* This is a different genus to the *Otomys* of Cuvier, which is *Euryotis* of Brants.

AMERICAN PHILOSOPHICAL SOCIETY.

On the *Patella Amæna* of Say, by Isaac Lea.—In this paper Mr. Lea gives a Synonymy, showing that the *Patella Amæna* of Say was first described by Müller, under the specific name of *Testudinalis*, Zool. Dan. p. 237; and Mr. Couthouy, having lately given an elaborate description of the animal, in the Boston Journal of Natural Science, showing that it belongs to the new genus *Patelloida*, recently established by Quoy and Gaimard; Mr. Lea argues that it should henceforth be called *Patelloida Testudinalis*.

Mr. Dunglison referred to a curious but not unique case, of a worm in the eye of a horse now in Baltimore. The particulars were contained in a letter to him from Dr. Joshua J. Cohen, of Baltimore. This entozoon is a species of filaria (see *Filaria papillosa*, Rudolphi, Synops. p. 213.), probably from $3\frac{1}{2}$ to 4 inches in length, and situate in the aqueous humour, in which it moves about with great activity, but its motions are so constant, that it is difficult to appreciate its exact length. The great size of the anterior chamber of the horse's eye affords it ample space; and through the transparent cornea it can be observed as well as if it were in a glass vessel. The horse was sent up from Calvert county, Maryland.

Dr. Dunglison made some observations on the difficulty of accounting for its presence in this shut sack, and alluded to the different views of distinguished naturalists as to the generation of many of the lower tribes of the animal kingdom,—some presuming that they may be formed spontaneously, whilst others consider that the germs must always be received from without. The difficulty, he observes, applied to all the entozoa that infest the animal body; and this case was certainly not more difficult of explanation than that of entozoa found in the intestines of the fœtus in utero.

MISCELLANEOUS.

ON THE FLOWER OR FRUIT OF FERNS.

At a recent meeting of the Royal Academy of Sciences of Berlin (March 19, 1840), Prof. Link read a paper, in continuation of his previous memoirs on the structure of Ferns, treating of the flower or fruit. The sorus is in general situated on a receptacle which, when roundish, consists entirely of short spiral vessels, so called, vermicoid bodies, similar to the thickened extremity of the leaf nerves, which might

therefore be regarded as abortive receptacles. In the elongated receptacle, straight spiral vessels are met with. A spiral vessel never extends to the fruit. The parts which Sprengel years ago, Blume and Presl at present consider to be male organs of fructification and indistinctly figured, have been more accurately examined by Prof. Link, and illustrated by drawings. They are long hollow filaments, separated by septa into articulations, generally simple, rarely ramified; the last articulation is thicker, and filled with a delicate granular mass. It may also at times be observed that this mass is exuded at the last articulation, and surrounds this as a crust. These parts are frequently longer than the capsules, and are easily distinguished from the young capsules. It is certainly probable that they are the stamina of ferns, and Prof. Link has indeed found them, after frequent search, in most of the ferns which he subjected to microscopical examination. The germination of ferns is simple; the shell of the seed bursts regularly or irregularly, out of which the embryo grows forth in a foliaceous expansion, which subsequently first forms a bud, whence the plant proceeds in the form which it retains. This mode of germination presents, therefore, a similarity to that of monocotyledons, only that here the evolution of the embryo is a state, and one of rapid transition.

POTAMOGETON PRÆLONGUS.

This rare plant occurs plentifully in the river Waveney, which divides Norfolk from Suffolk, in the neighbourhood of Harleston and Bungay, where I gathered it in June last. The only other station, to the south of the Tweed, is in ditches near Caversham Bridge near Reading, where it was found by Mr. Borrer in May 1836.—CHARLES C. BABINGTON.

THE COCOS DE MER.

The singular plant known by the above title was for many years a source of inquiry, and gave rise to some most absurd and monstrous conjectures. Its gigantic fruit was occasionally picked up floating at sea, and sometimes carried by the currents to various shores of the Indian ocean. Astonishing virtues were attributed to it, and were supposed to be communicated to medicines drunk out of its

capacious shell. It is stated that as much as four hundred pounds sterling have actually been paid for a single nut.

The colonization of the Seychelles Archipelago by the French under M. de la Bourdonnais, the talented and patriotic governor of Mauritius, set the matter at rest. The Cocos de Mer was found growing in the islands of Praslin and C rieuse, whose mountains were abundantly covered with this stupendous plant. It is a palm, and like several other members of that family, the male and female flowers are found on different individuals. Its stem rises to the height of from 90 to 100 feet, and is crowned with the most superb leaves that can be imagined, which form a kind of pent-house around it as impervious to water as if covered by a roof.

The leaves exactly resemble in form those of the fan-palm, but their dimensions are vastly superior. There are many of them that, measured from the base of the stem, are 20 feet in length, and their ample folds cover a width of from 10 to 12 feet. It is not till it has attained the age of from 20 to 25 years that it begins to bear. The enormous drupes, hanging in clusters of four or five, are so heavy, that a plant of less strength would give way beneath a single bunch, and they hang three or four years before they are ripe enough to fall. Thus although only one fruit branch is put forth in the year, the produce of three or four seasons burdens the stem at a time, the aggregate weight of which is very considerable.

Description cannot do justice to the beauty of these forests, nor convey an adequate idea of the singular fruit they furnish. The nuts are mostly double ; but triple, quadruple, and sometimes, though very rarely, quintuple specimens are found. When green they contain a sweetish jelly-like substance of a refreshing quality. But when ripe the kernel is as hard as dry beach wood, quite white, and of a somewhat silky grain. They are left in a marshy spot to rot, a process which requires six or eight months before the shell can be emptied. They are applied to various uses, being very strong and light. Simply bored at the end they serve as very convenient buckets and kegs, which are in general use among all the inhabitants of the group of islands in which they are found ; many of them hold upwards of three gallons. Many thousands of the shells, sawed in half, are sent to Mauritius and Bourbon, where they are universally employed by the blacks for holding food and water ; they form also the best vessels that can be devised for baling out boats. The leaves are as good a covering for a house as shingles ; a roof well thatched with them lasts ten years without any repair. They are also employed, when young and white, for a great many purposes ; hats,

bonnets, baskets, fans, flowers and many other articles being manufactured from them.

It is a very remarkable fact that this plant will not flourish on any of the surrounding islands. Many have been planted on other islands, but they merely vegetate, and are widely different in appearance from the splendid plants of Praslin and Curieuse.

PROPAGATION BY HYBRIDS.

In the autumn of 1838, a male bird, the produce of a Goldfinch and a hen Canary bird, escaped from my aviary, and was not seen again until the following spring, when we were agreeably surprised by the re-appearance of our lost favourite in company with a Goldfinch. As the pair were inseparable, we at once suspected that they had mated, and in a few days our suspicions were confirmed by seeing them feed each other and collect materials for building. By watching their movements we soon discovered their nest in a cedar-tree near the aviary. In due time four eggs were laid, which I carefully removed and placed under a Canary bird; they however all proved abortive. In a few days after this disappointment a second nest was built by them in the same tree, which we left undisturbed, and the result was favourable; five birds were hatched, which I took from the nest when about ten days old and brought up by hand; of this number two cocks and two hens are still living.

I am aware that hybrids in a state of captivity and restraint have not unfrequently proved prolific when brought to pair with a mate of either of their parent stocks; but I do not remember that I ever heard an instance of an animal of pure breed in a wild and unrestrained condition by choice selecting an hybrid mate.

The following are the results of my experiments made during this spring and summer.

Early in the spring I paired one of these young cock birds (which I have described as being three parts Goldfinches to one part Canary bird) with a hen Canary; a nest was soon made and three eggs laid; the cock bird, however, destroyed the nest, but I succeeded in saving the eggs, and placed them under a Canary bird: of this number one young bird was hatched, which is now full-fledged and in good health. After this partial failure a second nest was built, which shared the fate of the former one; I then removed the cock bird and turned him into the aviary, when he almost immediately selected another Canary bird as his mate. Upon my putting this pair into a breeding-cage a nest was formed in less than a week, and four eggs were laid; I had now taken the precaution to line the nest basket

with flannel, so that although the nest was pulled to pieces, as on former occasions, the eggs escaped destruction, and upon them the Canary bird is now sitting. I again removed the cock bird, and upon his return to the aviary he at once *made up* again to his former mate, and she has this morning laid an egg. In truth I never saw a bird more ardent for propagation than this hybrid.

My second experiment has been made by pairing my other hybrid cock bird with an hybrid hen of the same nest; the result has been three eggs, one of which was hatched yesterday morning by a Canary bird.

Now as this second pair have proved prolific (which are three parts Goldfinches to one part Canary bird), I do not see any reason why I may not obtain next year an equally successful result, by putting together a pair of birds (if I succeed in rearing a male and female), the produce of my first experiment; and if so, a cross breed might be perpetuated, which would be five parts Canary birds to three parts Goldfinches.—GEORGE COOKSON.

METEOROLOGICAL OBSERVATIONS FOR JUNE, 1840.

Chiswick.—June 1. Very hot and dry. 2. Thunder storm, with rain in heavy showers. 3. Fine. 4. Overcast. 5. Drizzly. 6. Cloudless and hot: heavy rain at night. 7—11. Very fine. 12. Overcast and fine. 13—15. Very fine. 16. Hot and dry. 17. Fine: showery. 18. Showery in the morning: windy. 19. Slight rain. 20—24. Very fine. 25—29. Cloudy and fine. 30. Hazy: rain.

The mean temperature was within a fraction of the average for this month. The quantity of rain was moderate. Westerly winds were unusually prevalent. On the whole the weather may be considered as having been favourable.

Boston.—June 1. Fine: Therm. 78° one o'clock. 2. Cloudy: Therm. at noon 53°: rain P.M. 3, 4. Cloudy: rain P.M. 5, 6. Cloudy. 7. Fine: rain early A.M. 8. Fine. 9. Cloudy: rain P.M. 10, 11. Fine. 12. Cloudy: rain P.M. 13, 14. Fine. 15. Cloudy. 16. Fine. 17. Fine: rain early A.M. 18. Cloudy. 19. Rain. 20. Fine. 21. Cloudy: rain P.M. 22. Fine: rain early A.M.: rain P.M. 23. Fine: rain P.M. 24. Fine. 25. Cloudy: rain A.M. and P.M. 26. Fine. 27, 28, 29. Cloudy. 30. Fine.

Applegarth Manse, Dumfries-shire.—June 1, 2. Mild with occasional showers. 3. Fine day: bright sunshine. 4. Cloudy but dry. 5. Rain in the evening. 6. Rain in the morning. 7, 8. Very fine day. 9. Showery all day. 10. Fine day: rain early. 11. The same, but fair. 12. Wet all day. 13. Very fine day. 14. Wet greater part of the day: thunder. 15. Wet afternoon. 16, 17. Stormy and wet afternoon. 18. Showery, but calm. 19. Wet A.M.: cleared up P.M. 20. Showery A.M.: cleared and fine. 21. Showery all day. 22. Rain A.M. 23. The same: cleared and was fine. 24. Fair all day and cold. 25. Showery. 26. Drizzling all day. 27. Showery. 28, 29. Beautiful summer day. 30. Wet morning.

Sun shone out 27 days. Rain fell 21 days. Thunder 1 day. Calm 10 days. Moderate 7 days. Brisk 9 days. Stormy breeze 1 day. Boisterous 3 days.

Wind north 1 day. North-east 2 days. South $2\frac{1}{2}$ days. South-west 10 days. West-south-west 1 day. West $8\frac{1}{2}$ days. West-north-west 1 day. North-west 2 days. West by north 2 days.

Days of Month. 1840. June.	Barometer.			Thermometer.				Wind.			Rain.			Dew point. Lond.: Roy. Soc. 9 a.m.									
	Lond.: Roy. Soc. 9 a.m.	Chiswick.		Boston. 8½ a.m.	Dumfries-shire. 9 a.m.	Lond.: Roy. Soc.		Chiswick.	Dumfries-shire. 8½ a.m.	Boston. Max. Min.	Lond.: Roy. Soc. 9 a.m.	Chiswick. 1 p.m.	Bost. Dumfries-shire.		Lond.: Roy. Soc. 9 a.m.	Chiswick.	Boston.	Dumfries-shire.					
		Max.	Min.			Fahr. 9 a.m.	Self-register. Max. Min.																
1.	30.212	30.195	29.900	29.50	29.88	29.85	66.7	83.0	55.7	84	50	70	59½	50	S.	SW.	W.	SW.	...	...	...	...	58
2.	30.206	29.981	29.808	29.18	29.75	29.73	64.8	82.7	60.5	65	45	64	59	48	NW.	NW.	NW.	W.	...	...	...	...	60
3.	30.106	30.144	30.082	29.36	29.90	30.00	56.8	66.2	48.8	63	41	54	60	45	NW.	NW.	NW.	W.	...	...	...	...	48
4.	30.198	30.168	30.044	29.59	30.00	29.98	55.7	61.0	48.3	66	51	52.5	59½	46	NW var.	W.	calm	W.	...	...	...	...	50
5.	30.040	30.040	29.928	29.52	29.95	29.93	57.7	65.8	53.5	65	50	53	56	47	W.	calm	calm	SE.	NE.	NE.	...	...	54
6.	29.938	29.919	29.799	29.38	29.78	29.76	61.8	66.2	52.2	77	55	59	61	47½	E.	SE.	SE.	W.	...	...	...	...	54
7.	30.018	30.014	29.956	29.30	29.70	29.85	63.2	72.3	56.8	74	41	65	61½	52½	SW var.	W.	W.	W.	...	...	...	...	58
8.	30.072	30.045	29.949	29.45	29.84	29.78	63.7	73.8	52.5	75	57	67	67	40	SE.	S.	calm	S.	...	...	...	...	54
9.	30.008	29.986	29.908	29.40	29.78	29.80	67.3	72.6	60.8	78	50	65	63	55	SE.	SW.	SW.	SW.	...	...	...	...	53
10.	30.014	30.016	29.993	29.34	29.79	29.83	64.8	74.4	59.5	77	43	67.5	64	55	SE.	W.	calm	W.	...	...	...	...	60
11.	30.100	30.082	29.974	29.42	29.82	29.77	64.3	71.7	52.8	74	59	66	64	45	S.	W.	W.	W.	...	...	...	...	59
12.	29.998	29.988	29.841	29.33	29.70	29.60	64.6	73.3	61.2	71	57	64	59	53	S.	SW.	calm	SW.	...	...	...	...	55
13.	29.992	30.045	29.965	29.35	29.75	29.62	63.5	71.2	59.0	77	45	59	63	49	S.	W.	calm	W.	...	...	...	...	60
14.	30.096	29.997	29.970	29.48	29.73	29.65	65.7	72.8	56.5	74	47	63	62	48½	W.	N.	N.	W.	...	...	...	...	57
15.	30.054	30.027	29.884	29.43	29.74	29.60	64.8	75.3	54.4	77	56	63	62	50	S.	SW.	N.	W.	...	...	...	...	59
16.	29.868	29.860	29.784	29.18	29.50	29.30	66.8	74.3	59.6	78	57	68	61	53	SSW.	SW.	W.	SW.	...	...	...	...	59
17.	29.836	29.804	29.767	29.12	29.32	29.37	64.3	74.3	59.5	73	49	66	61½	51	S.	SW.	W.	SW.	...	...	...	...	61
18.	29.870	29.945	29.858	29.19	29.50	29.60	61.8	71.6	52.2	70	49	61	56	45½	NW.	W.	W.	W.	...	...	...	...	58
19.	29.970	29.988	29.895	29.35	29.42	29.59	61.7	67.7	53.0	62	45	57	60	49	S.	SW.	W.	SW.	...	...	...	...	53
20.	30.150	30.201	30.103	29.50	29.82	30.00	61.2	72.6	50.6	75	52	60	61	47	W.	W.	W.	W.	...	...	...	...	58
21.	30.198	30.193	29.917	29.60	29.80	29.70	65.0	69.8	56.6	77	53	61.5	60	46½	S.	SW.	calm	W.	...	...	...	...	54
22.	29.836	29.823	29.741	29.16	29.40	29.48	63.8	76.2	66.8	72	49	61	58	46½	S.	W.	W.	W.	...	...	...	...	56
23.	29.736	29.659	29.659	29.14	29.50	29.62	62.0	71.7	53.5	70	46	59	59	47½	SW.	W.	W.	N.	...	...	...	...	55
24.	29.838	29.845	29.805	29.32	29.70	29.74	54.3	67.6	49.4	64	44	53	56	39	NW.	NW.	N.	NW.	...	...	...	...	52
25.	30.010	30.004	29.958	29.39	29.78	29.86	57.4	60.6	49.0	64	47	57	57½	47	NW.	NW.	W.	WNW.	...	...	...	...	48
26.	30.154	30.115	30.090	29.56	29.95	30.00	61.3	66.8	50.7	67	54	60	59	45	NW.	NW.	W.	NW.	...	...	...	...	50
27.	30.196	30.146	30.056	29.60	30.00	29.97	63.7	65.4	56.2	74	57	61	61½	45	W.	W.	NW.	W.	...	...	...	...	54
28.	30.092	30.045	30.022	29.52	29.99	29.94	64.8	70.4	59.7	73	51	62	69	51½	NW.	E.	NW.	NW.	...	...	...	...	55
29.	30.100	30.041	29.993	29.54	29.94	29.87	61.4	70.6	56.6	74	51	60	67½	46½	S.	W.	calm	W—S.	...	...	...	...	58
30.	30.018	29.970	29.893	29.37	29.74	29.74	63.3	73.0	57.8	69	47	68	62	55	S.	S.	W.	W.	...	...	...	...	59
Mean.	30.017	30.015	29.918	29.68	29.415	29.761	62.6	71.2	55.5	71.96	49.93	61.5	61	48.2					Sum.	1.38	1.99	2.37	Mean. 55.5

INDEX TO VOL. V.

- ACALEPHA** of Ireland, 248.
- Acanthaceæ**, on the existence of spiral cells in the seed of, 135.
- Actinia**, description of a new species of, 182.
- Actiniadæ**, on the British, 180.
- Adamsia**, description of the new genus, 183.
- Ænictus**, description of the genus, 266.
- Agrilus**, description of a new species of, 365.
- Alga**, account of an, which colours Ballydrain Lake, 75.
- American Philosophical Society**, 421.
- Amphipeplea glutinosa**, notice respecting, 147.
- Anabaina**, new species of, 81.
- Anas**, new species of, 61.
- Animal and vegetable life**, effects produced on by the winter of 1838, 334.
- Animalcules**, occurrence of in red snow, 223; in the antheridia of *Polytrichum*, 291; notice respecting, 363.
- Annelides**, Irish, contributions towards a history of, 168, 305.
- Anolius**, remarks on the genus, 110.
- Anomma**, description of the new genus, 326.
- Anser ferus**, notice respecting, 7.
- Aphanizomenon recurvum**, description of, 82.
- Aphrodita Hystrix**, description of, 305.
- Argulus foliaceus**, notice respecting, 221.
- Aristotle's history of animals**, remarks on, 358.
- Armadillos of Guiana**, on the habits of the, 32.
- Arundinaria Schomburgkii**, description of, 46.
- Aspidium lobatum**, notes on, 356.
- Australia**, notes on the zoology of, 116.
- Babinton, Charles C.**, on *Teucrium regium*, 375.
- Babington, C. C.**, on *Ulex*, 300.
- Bacillariæ**, on the structure and affinities of the, 139.
- Balanus**, on a new species of, 333.
- Ball, Mr.**, on a new species of *Loligo*, 68.
- Bartria Odontites**, note on the occurrence of, 357.
- Bauer, F.**, observations on *Ergot*, 47.
- Beania**, new genus of *Zoophyte*, 272.
- Bennett, J. J.**, description of *Arundinaria Schomburgkii*, 46.
- Bentham, Mr.**, on a new pitcher-plant from British Guiana, 47.
- Berwickshire Naturalists' Club**, Transactions of the, noticed, 129.
- Bird**, on the bone of an unknown *Struthious*, 166.
- Birds**, notices respecting some Irish, 6, 364; new species of, from Malaya, 51; new species of, from Luzon, 60; notices respecting some, from South America, 62; from South Australia, 61; descriptions of several new Australian, 143; a list of the genera of, noticed, 214; catalogue of, from the neighbourhood of Erzeroom, 215, 350.
- Bolina Hibernica**, description of, 67.
- Botanical Society of London**, proceedings of the, 356.
- Botanical travellers**, information respecting, 29, 116, 205, 282, 340.
- Bottle-nosed Whale**, notice respecting, 361.
- Bowerbank's fossil fruits and seeds**, 410.
- Brachytria**, new species of, 16.
- Brongniart, A.**, on the hairs on the stigma of *Campanulæ*, 380.
- Burmanniaceæ**, on some new Plants of the order, 132.
- Callidium**, new species of, 18.
- Camaridium**, new species of, 116.
- Carnivora**, on certain distinctive characters in the crania and dentition of the, 25.
- Cedar**, on a crystalline matter found on the recently cut wood of, 131.
- Cephalopoda**, descriptions of new genera of, 69.
- Cerambycidæ**, descriptions of several new genera and species of, 14.
- Chelonia Caouana**, occurrence of on the British coast, 8.
- Clausilia**, remarks on the structure of the clausium of, 243.
- Closterinæ**, structure of, 415.
- Cocos de Mer**, 422.
- Coptoma**, new species of, 18.
- Corymorpha nutans**, observations on, 309.

- Craitaiomyx, description of the new genus, 54.
- Crustaceæ of Ireland, 255.
- Cuckoo, East Indian, 406.
- Curtis, J., descriptions of some rare or interesting indigenous insects, 274.
- Curtis's British Entomology, 412.
- Cycadeæ, on the structure of the tissues of the, 48.
- Cyclopterus coronatus, notice respecting, 9.
- Cylindrella, description of the new genus, 241.
- Cymbocarpa, description of the genus, 133.
- Dalrymple on Closterium, 415.
- Datisca cannabina, notice respecting, 69.
- Delphinus melas, occurrence of, in Ireland, 6.
- Denny, H., natural history of the neighbourhood of Leeds, 382.
- Dickie, G., on some viviparous plants, 297.
- Dickson and Ross, on a collection of birds from Erzerum, 350.
- Dictyostega, characters of some new species of, 133.
- Didymocantha, description of the genus, 20.
- Dolphin, on a new fossil species of, 150.
- Dominica, on five new orchidaceous plants from, 115.
- Don, Prof. D., on the structure of the tissues of the Cycadeæ, 48.
- Doris, new species of, 85; new British species of, 103.
- Dorylidæ, monograph of the, 188, 258, 315, 396.
- Dorylus, descriptions of several new species of, 268, 315.
- Dorx, characters of the genus, 15.
- Duck, new species of, 61.
- Dysodil, the production of Infusoria, 150.
- Echinodermata of Ireland, with descriptions of several new species, 99, 245.
- Ehrenberg, Prof., on Dysodil, as the product from the shells of Infusoria, 150.
- Embryo, formation of the, views of Schleiden and Wydler, 226; of Mirbel and Spach, 228; of Meyen, 235.
- Embryology, Vegetable, on the recent doctrines of, 225.
- Entozoa, strength of the vital principle in, 379.
- Eolidia, new species of, 90.
- Ergot, observations on, 47.
- Erichson's, Dr., Genera et Species Staphylinorum, reviewed, 127.
- Eschricht, M., on a new genus of Cephalopoda, 69.
- Euplocamus, notice respecting the genus, 91.
- Eyton, T. C., on some new species of Birds from Malaya, 51.
- Farnesia, characters of the genus, 43.
- Fauna of part of Herefordshire, 184.
- Fern, description of a new species of, 130.
- Ferns, History of the British, reviewed, 36; flower or fruit of, 421.
- Fishes, Irish, notices respecting some, 9.
- Flannel composed of Confervæ and Infusoria, notice respecting, 69.
- Flustra, new species of, 101.
- Forbes and Goodsir, on the Corymorphanutans, 309.
- Forbes, E., on some new and rare British Mollusca, 102; on the British Actinidæ, 180; note respecting animalcules, 363.
- Frazer, Mr., on two new species of Birds, 60.
- Fresenius, Dr., on Datisca cannabina, 69.
- Fruits, fossil, Bowerbank on, 410.
- Fungi of the North of Ireland, catalogue of the, 3.
- Galicis Allamandi, on the habits of, 31.
- Gasparini, Sig., on a new genus of Leguminosæ, 43; on the germination of Grammitis, 43.
- Gasterosteus spinachia, on the nests of, 148.
- Germer's, Prof., petrified insects of Solenhofen, noticed, 128.
- Giraud, H., on the recent doctrines of vegetable embryology, 225.
- Goepfert, Prof., on Pinus Pumilio, 147.
- Gonioporis, description of the new genus, 104.
- Goodsir and Forbes, on Corymorphanutans, 309.
- Goodsir, J., on the anatomy of Linnæus involutus, 22.
- Gould, J., account of his expedition to examine the Zoology of Australia, 116; on several new Australian birds, 143.
- Grammitis, on the germination of, 43.
- Grasses, notice respecting two Abyssinian species of, 70.
- Gray's, G. R., List of the Genera of Birds, noticed, 214.
- Gray, J. E., catalogue of the species of Reptiles collected in Cuba by W. S. MacLeay, 108; on a new marsupial animal, 150; on the clausium of Clausilia, 243; on the freshwater carriers of Mr. Swainson, 257; manual of land and freshwater shells of the British islands reviewed, 288.
- Griffith's, W., account of an expedition into Bootan, 119, 205, 405.
- Guiana, account of Mr. Schomburgk's expedition into, 282.
- Gulliver, G., on the blood corpuscles of

- mammiferous animals, 125; on the muscular fibres in the œsophagus and heart of some Mammalia, 349.
- Gulo barbarus*, on the habits of, 30.
- Hairs, retractile, of the stigma of *Campulæ*, 380.
- Hare, on a remarkable change of habit in the, 362.
- Heliophora nutans*, description of, 47.
- Helicidæ, observations on the family of the, 238, 243.
- Heliomanes, new species of, 17.
- Hepaticæ, on the structure of the cellular membrane in, 73.
- Hincks, Rev. W., on a new species of *Balanus*, 333; notice respecting Gray's edition of Turton's manual of land and freshwater shells, 366.
- Hirundo purpurea* shot in Britain, 146.
- Hodgson, B. H., on four new species of Otter, 27.
- Holothuria, on some new species of, 100.
- Humming-birds, on the food and structure of the, 290.
- Hybrids, propagation by, 424.
- Iluanthos, a new genus of Zoophyte, 184.
- Impregnation in plants, notice respecting, 69.
- Infusorial animalcules in red snow, 223.
- Insects, descriptions of some rare or interesting indigenous, 274; petrified, of Solenhofen, noticed, 128.
- Intestinal worms, their tenacity of life, 377.
- Invertebrata, descriptions of some new species of, 84.
- Ireland, fungi of the north of, 3; on the fauna of, 6; on the mollusca nudibranchia and tunicata of, 84; contributions towards a history of the Annelides of, 168; additions to the fauna of, 245.
- Ischnotes, new species of, 18.
- Jabiru (*Mycteria Americana*), 399.
- Johnston, Dr. G., on the Irish Annelides, 168, 305; on a new genus of British Zoophyte, 272.
- Johnson, H., on the occurrence of the bottle-nosed whale, 361.
- Juniperus Virginiana*, on a certain crystalline matter found in, 131.
- Kippist, R., on the existence of spiral cells in the seeds of *Acanthaceæ*, 135.
- Knobs, woody, 373.
- Labidus, on the females of, 192; descriptions of several new species of, 196, 258.
- Lankester, Dr. E., on the origin of wood, 369.
- Leeds, natural history of its vicinity, 382.
- Leguminosæ, new genus of, 43.
- Leighton, W. A., *Excerpta Botanica*, 380.
- Lestris Richardsonii*, notice on, 6.
- Limneus involutus*, description and anatomy of, 22.
- Lindley, Prof., characters of five new Orchidaceous plants, 115; on animalcules in the antheridia of *Polytrichum*, 291.
- Lingwood, R. M., on the Fauna of Herefordshire, 184.
- Link, Prof., on the flower or fruit of ferns, 421.
- Linnæan Society, proceedings of, 44, 130.
- Loligo, new species of, 68.
- Lophotus, remarks on the genus, and description of a new species of, 329.
- Lutra, descriptions of four new species of, 27.
- MacLeay, W. S., notes on the habits of Cuban reptiles, 108.
- Malacopteron, description of the new genus, 53.
- Mallodon, new species of, 15.
- Mammalia, on the muscular fibres in the œsophagus and heart of some, 349.
- Mammiferous animals, observations on the blood corpuscles of, 125.
- Megalorhynchus, description of the new genus, 56.
- Membrane, cellular, on the structure of, 73.
- Meteorological observations, 71, 151, 223, 295, 367, 425.
- Meyen, Prof. F., on the organs of secretion in plants, 40; Report on the progress of Vegetable Physiology, noticed, 211.
- Microscopes, on the application of, in determining fossils, 65.
- Microscopical Society, proceedings of, 64, 139, 291, 415.
- Miers, J., on some new Brazilian Plants, 132.
- Miram, Dr. C. E., on the tenacity of life of intestinal worms, 377.
- Mirbel, M. de, on the development of the embryo in *Zea Mays*, 231.
- Miscellanea Zoologica, 169, 272, 305.
- Mollusca, of Ireland, 10, 245; nudibranchia, new species of, 84; tunicata, new species of, 93; on some new and rare British, 102; on the geographical distribution of, in Great Britain, 366.
- Montagua, new species of, 106.
- Mosses, on the structure of the cellular membrane in, 73.
- Mycteria Americana*, on the habits of, 346.
- Myliobatis aquila*, notice respecting, 146.
- Narcissus, on two new species of, 39.
- Nautilus, new species of, 99.
- Necydalis, new species of, 16.
- Nereis, descriptions of several new species of, 170.
- Newman, E., nonnullorum *Cerambyciturum*

- novorum characteres, 14; History of British Ferns, reviewed, 316.
- Ogilby, Mr., characters of a new Squirrel, 62.
- Olfers, M. von, on a new species of fossil Dolphin, 150.
- Ophiocoma, new species of, 99.
- Opposums, notes on the habits of, 343.
- Orchidaceæ, characters of some new species of, 115.
- Orkney Natural History Society, proceedings of, 137, 360.
- Osborne, J., on Aristotle's History of Animals, 358.
- Otter, descriptions of four new species of, 27.
- Otters of Guiana, on the habits of the, 282.
- Owen, Prof., on the application of the microscope to the determination of fossil remains, 65; on the bone of an unknown Struthious bird, of large size, from New Zealand, 166.
- Papilionaceæ, on the irregular form of the flowers of, 153.
- Patella, new species of, 108.
- Patterson, R., on the Bolina Hibernica, 67.
- Peccari, 401.
- Pelexia, new species of, 116.
- Perameles, new species of, 150.
- Perideræa, characters of the new genus, 39.
- Pfeiffer, Dr. L., on the family Helicidæ, and description of a new genus, 238.
- Phlæomys, new species of, 58.
- Phlyctænodes, characters of the genus, 20.
- Phoracantha, remarks on the genus, 19.
- Pinus Pumilio, observations on, 147.
- Pithanotes, new species of, 15.
- Planaria vittata, description of, 248.
- Plants, collected in Southern Spain and Portugal, synopsis of the, reviewed, 38; on the organs of secretion of, 49; on the development of the vascular tissue of, 66; descriptions of some new Brazilian, 132; on the structure of the ovule in, 162; on the sexes of, 226; notes on some viviparous, 297.
- Pleurothallis, new species of, 115.
- Pleurotoma, new species of, 107.
- Polycera, new species of, 92.
- Polygastrica, Mr. Forbes on, 364.
- Polygonum viviparum, mode of reproduction in, 298.
- Polynoe scolopendrina, description of, 307.
- Polype, on a remarkable Hydroid, 309.
- Potamogeton Prælongus, 422.
- Potos caudivolvulus, on the habits of, 29.
- Pteroglossus, new species of, 59.
- Quekett, E. J., on the development of the vascular tissue of plants, 66; on a certain crystalline matter found on the recently cut wood of the Red Cedar, 131.
- Ranunculaceæ, on the structure of the ovule in the, 165.
- Reptiles, Cuban, on the habits of the, 108.
- Rhagiomorpha, new species of, 21.
- Rhogmus, description of the new genus, 323.
- Rissoa, new species of, 97, 107.
- Rodent, on a new species of, 57.
- Rodentia, Waterhouse on, 418.
- Rodriguezia, new species of, 116.
- Ross and Dickson, on a collection of birds from Erzerum, 350.
- Royal Irish Academy, proceedings of, 67, 358.
- Rylands, T. G. R., on Aspidium lobatum, 356.
- Sceleocantha, new species of, 14.
- Schleiden, Prof. M. J., on the structure of the cellular membrane in Mosses and Hepaticæ, 73; on the structure of the ovule in plants, 162.
- Saxifraga cernuosa, mode of reproduction in, 298.
- Schomburgk, R., account of his expedition into Guiana, 29, 282, 343, 399; on the Curata, of the culm of which the Indians form their blow-pipe, 46; on the Snake-nut tree of Guiana, 202.
- Schuckard, W. E., monograph of the Dorylidæ, 188, 258, 315, 396.
- Scrophularia aquatica, remarks on, 1.
- Shells, a Manual of the British Land and Freshwater, review of, 288.
- Selby, P. J., on the effects produced upon animal and vegetable life by the winter of 1838, 334.
- Snake-nut, notice respecting the, 70; description of the tree, 202.
- Society, Microscopical, 415.
- Spiral cells, occurrence of in the seeds of Acanthaceæ, 135.
- Squirrels, on two new species of, 62.
- Staphylinorum, Genera et Species, auct. G. F. Erichson, reviewed, 127.
- Stelis, new species of, 115.
- Stemoptera, characters of the new genus, 134.
- Stenoderus, new species of, 21.
- Stevens, C. A., on Scrophularia aquatica, 1.
- Stickleback, on the nests of the fifteen-spined, 148.
- Taylor, T., on the Fungi of the North of Ireland, 3.
- Tessaromma, descriptions of some new species of, 20.
- Templeton, J., catalogue of the species of Fungi of the North of Ireland, 3.

- Teucrium regium*, found in Monmouthshire, 375.
Thelidomus, notice respecting, 257.
 Thompson, W., on the Fauna of Ireland, 6, 245; observations on *Limneus involutus*, 22; on a minute Alga which colours Ballydrain Lake, 75; on the Mollusca nudibranchia and tunicata of Ireland, 84; on *Argulus foliaceus*, 221; on a torpedo taken on the Irish coast, 292; notes on Irish birds, 364.
 Thouars, du Petit, theory of the origin of wood, 369.
 Torpedo, notice of a, taken on the coast of Ireland, 292.
 Toucan, on a new species of, 59.
 Toxentes, new species of, 15.
 Trail, Prof., on the food and structure of the Humming-birds, 290.
 Travellers, Botanical, information respecting, 29, 116, 205, 282, 340, 405.
 Tritonia, new species of, 88.
 Tropidurus, new species of, 110.
 Troschel, Dr., on *Amphipelea glutinosa*, 147.
 Tschudy, M., his travels in Peru, 398.
 Tweedside Physical and Antiquarian Society, proceedings of, 136.
 Typhlopone, description of the genus, and several new species of, 262; descriptions of two new species of, 326; note on the habits of, 328.
 Unio Itineraria, notice respecting the, 219.
 Ulex, observations on, 300.
 Vegetable and animal life, effects produced on by the winter of 1838, 334.
 Vegetable Embryology, on the recent doctrines of, 225.
 Vegetable Physiology, Meyen's Report on the progress of, noticed, 211.
 Vermes of Ireland, 247.
 Vespertilio ædilis, notice respecting, 149.
 Walpers, H., on the irregular form of the flowers of the Papilionacæ, 153.
 Walton Park, wild animals in, 394.
 Waterhouse, G. R., on certain characters in the crania and dentition of the Carnivora, 25; on a new species of Squirrel, 63; on a new species of Rodent, 57; on a new species of Toucan, 59; on a new species of Lophotus, 329; on the Rodentia, 418.
 Webb's, P. B., Iter Hispaniense and Otia Hispanica, reviewed, 38.
 Wernerian Natural History Society, proceedings of, 290.
 Westcott, Mr., on a new species of Fern, 130.
 Wood, origin of, 369.
 Xystrocera, new species of, 19.
 Zea Mays, on the development of the embryo in, 231.
 Zoological Society, proceedings of, 51, 139, 215, 348, 417.
 Zoological Travellers, information respecting, 29, 116, 282, 340, 398.
 Zoophyta, on some new Irish species of, 101, 249; new British genus of, 272.

END OF THE FIFTH VOLUME.



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REMARKS

ON SOME PASSAGES IN THE REVIEW

OF

“Principles of General and Comparative Physiology,”

IN THE

EDINBURGH MEDICAL & SURGICAL JOURNAL,

JANUARY, 1840.

By WILLIAM B. CARPENTER, M.D., M.R.C.S., &c.

IT is with much pain that I feel compelled to request the attention of the readers of this journal to the following remarks. My object in putting them forth to the world is solely to defend myself from injurious imputations. I have no underhand purpose to serve. I write more in sorrow than in anger. But the mode in which I have been attacked leaves me, in the opinion of my friends as well as in my own, no choice but to reply.

When I sent forth my volume into the world, it was with the confident expectation that, whatever reception it might experience, it would be judged of by its merits alone. Few persons were less disposed to over-estimate these than myself. I was well aware of its many imperfections. I prepared myself, therefore, to expect unfavourable criticism; and I determined to allow no feeling of pride, or of vexation at the mode in which the correction might be administered, to interfere with my profiting by it. Until the publication of the last number of the *Edinburgh Medical and Surgical Journal*, however, I have had little occasion for such an exercise of self-control. The general opinions expressed of my work, both by the public press, and by individuals well qualified to estimate it, have been far more favourable than I had dared to anticipate; and I have had the unexpected gratification of receiving the highest approbation from quarters in which no personal regard could have exerted any influence.

Had the review, on which I now feel called on to remark, been executed with *good faith*, I should have remained silent, however depreciating its tone might have been. But I have been held up to public reprobation for entertaining opinions *against* which I have most positively expressed myself; and I have been condemned, on this false ground, as altogether unfit for the duties of a Public Instructor—a post of which it is my highest ambition to be deemed worthy. Such statements, from an authority so respectable as the *Edinburgh Medical and Surgical Journal*, must, if I allow them to remain unrefuted, exert a prejudicial influence over the whole of my subsequent career; and the reply which I therefore feel it necessary to make, is not dictated by animosity towards the con-

ductors of that publication, but is solely destined to show that some of my opinions have been misrepresented, and that others have been undeservedly condemned.

It is in the Chapter on the "Nature and Causes of Vital Actions," that all the more important passages occur, which are spoken of with reprobation, as containing doctrines of an injurious tendency. This Chapter is but an amplification, in a more popular form, of an Essay "On the Laws regulating Vital and Physical Phenomena," to which the STUDENTS' PRIZE was awarded two years since by the *Professors of the University of Edinburgh*; and the greater part of which was published in the *Edinburgh New Philosophical Journal* (April, 1838), edited by Professor Jameson. There is not a single *principle* in the Chapter just referred to, which is not contained, and emphatically stated, in that Essay. The Professors of the University of Edinburgh are virtually charged, therefore, by the Reviewer of my Principles of Physiology, with having sanctioned opinions which are "detrimental to the best interests of mankind," and which prevent my work (whatever may be its value in other respects) from being "held up as a safe guide in the study of those sciences, the principles of which it professes to place before the reader."—(*Review*, p 228). It is very probable that all these gentlemen may not agree in the opinions I have expressed; but it is not to be conceived that *they* should have selected for the Prize, out of the many Essays sent in for competition, one which advocated doctrines of so dangerous a tendency as those imputed to me by the Reviewer.

The chief *misrepresentation* of which I have to complain, is the imputation to me of the opinion "that all the visible creation was at first made so perfect, that the machine of nature runs its allotted course, without requiring the continued superintendence of the Creator" (*Review*, p. 219);—an opinion which, if really expressed by me, would certainly imply my disbelief in Revelation. No passage is *quoted* by the Reviewer in support of this imputation; but the concluding paragraph in my volume is referred to as justifying it. This paragraph, which formed the conclusion of my Essay when sent in for competition, I shall give in full, that my readers may judge for themselves:—

"If, then, we can conceive that the same Almighty *fiat* which created matter out of nothing, impressed upon it one simple law which should regulate the association of its masses into systems of almost illimitable extent, controlling their movements, fixing the times of the commencement and cessation of each world, and balancing against each other the perturbing influences to which its own actions give rise,—should be the cause, not only of the general uniformity, but of the particular variety of their conditions, governing the changes in the form and structure of each individual globe protracted through an existence of countless centuries, and adjusting the alternation of 'seasons and times, and months and years,'—should people all these worlds with living beings of endless diversity of nature, providing for their support, their happiness, their mutual reliance, ordaining their constant decay and succession, not merely as individuals but as races, and adapting them in every minute particular to the conditions of their dwelling,—and should harmonise and blend together all the innumerable multitude of these actions, making their very perturbations sources of new powers;—when our knowledge is sufficiently advanced to comprehend these things, then shall we be led to a far higher and nobler conception of the Divine Mind than we have at present the means of forming. But, even then, how infinitely short of the reality will

be any view that our limited comprehension can attain, seeing, as we ever must in this life, 'as through a glass, darkly;'—how much will remain to be revealed to us in that glorious future, when the Light of Truth shall burst upon us in unclouded lustre, but when our mortal vision shall be purified and strengthened so as to sustain its dazzling brilliancy."

The import of this, and of several other passages in my work, will depend upon the meaning assigned to the term *Law of Nature*. That the readers of it might not misconceive my views, I have taken care to explain, very early in the volume, the meaning which I attach to it. A whole paragraph is employed on the subject in the Chapter to which I have already referred, which is the first in the "General Physiology"; and, as this Chapter has received the especial notice of the Reviewer, it is scarcely to be supposed that he could accidentally overlook the passage. Moreover, this paragraph is referred to in the Glossarial Index, as containing the explanation of the term "Law of Nature." The last portion of it stands as follows:—

"To imagine that the plan of the Universe, once established with a definite end, could require alteration, during the continuance of its existence, is at once to deny the perfection of the Divine attributes; whilst, on the other hand, to suppose, as some have done, that the properties first impressed upon matter would *of themselves* continue its actions, is to deny all that Revelation teaches us regarding our continued dependence on the Creator. Let it be borne in mind, then, that when a *law* of Physics or of Vitality is mentioned, nothing more is really implied than a simple expression of the *mode* in which the Creator is *constantly* operating on inorganic matter, or on organised structures."

What shall be said of the *good faith* of a Reviewer who can impute to me opinions diametrically opposite to those which I have so broadly expressed, without quoting a single passage in support of his assumption?

This portion of the charge against me, although the most important in itself, is not that on which the Reviewer dwells the longest. The greater part of his animadversions are bestowed upon my opinions on Life or Vital Action, which are spoken of as "leading to dangerous conclusions" (p. 215),—as "highly exceptionable and totally destitute of foundation" (p. 219),—as "tending to lead the mind to the doctrines of materialism" (p. 219),—and as having "been repeatedly refuted" (p. 217). These dangerous, often-refuted, and baseless opinions may be briefly expressed in the two following propositions:—1. That Vital Phenomena are the result of the properties of organised tissues, called into action (according to regular laws) by the requisite conditions being afforded to the bodies which possess them. 2. That these vital properties are not, as it is commonly expressed, superadded to matter in the process of organisation; but that this act calls out or developes the properties which previously existed in the material particles subjected to it, but which are not manifested except under the peculiar circumstances which this new disposition of them produces. This act of organisation always requires a pre-existing organism for its performance.

The *first* of these doctrines is held by almost every physiologist of the present day; and it is plainly stated by Dr. Alison in his highly-philosophic "Outlines of Physiology" (3rd. Ed. pp. 7, 8). It must be the *second*, therefore, which incurs the reprobation of the Reviewer. Now it would scarcely be supposed, from the language

which has just been quoted, that, in favour of this opinion, Dr. PRICHARD (to whose reputation my humble tribute can add nothing), the late Dr. FLETCHER (whom few have surpassed in acuteness of reasoning), Mr. ROBERTON of Manchester, and many other writers, have expressly contended; and that to none of their arguments has any formal reply been made. In the "Essay on the Doctrine of a Vital Principle" by Dr. Prichard, there is a long digression, in which the two questions—as to the distinctness of Mind and Matter,—and the separate existence of a Vital Principle, are clearly shown to have none but a remotely analogical relation. The same is stated by Dr. Alison. Our notion of the nature of Vitality, he remarks (p. 3) "has no connection whatever with the notion of Mind as distinguished from Matter." This testimony from Dr. A. is the more valuable for my present object, since he does not accord with the second proposition. What, then, are we to think of the qualifications of a Reviewer who could thus mix up what writers of the first authority have separated, and denounce opinions as dangerous that have no tendency whatever to the "materialism" which he regards with so much horror?

But, fortunately for myself, I can produce an unasked testimony in behalf of my real views, from an individual whose name should silence any imputations of this kind from an anonymous Reviewer. In the Treatise on Physiology contributed by Dr. ROGET to the Encyclopædia Britannica, the substance of my Essay already alluded to, with its conclusions, is embodied; and the original is thus referred to:—"However the laws which regulate the vital phenomena may appear, on a superficial view, to differ from those by which physical changes taking place in inorganic matter are governed, still a more profound investigation of their real character will shew that, when viewed abstractly from the consideration of final causes, there is really no essential difference between them, either as to their comprehensiveness, their uniformity of action, or the mode in which they are to be established by the generalization of particular facts.*" I shall not, therefore, occupy further space in defending myself from charges so groundless; since it will be easy for me, should they ever be repeated, to bring forward a body of testimony, which, with those unaccustomed to enquiries of this kind, will weigh more than argument.

I should not think it worth while to notice the remainder of the Critique, were it not that in some parts of it the bad faith and ignorance of the Reviewer are manifested in a way which may confirm, if confirmation be needed, what has been already stated. I shall take for illustration, from among many of which the fallacy could be as easily exposed, two of the remarks upon my Chapter on Respiration.

The Reviewer commences by asserting that, "with a strange want of consistency, the author attributes the changes effected on the nutritious fluid in plants by the air to a vital process, whilst in animals, he avers that the aeration of their nutritious fluid is 'a change dependent on physical laws.'"—(*Review*, p. 223). So far is this from being true, that the whole discussion of the physical character of the true Respiratory process, including the phrase

* * See an Essay by Mr. Carpenter on the difference of the Laws regulating Vital and Physical Phenomena."

quoted by the Reviewer, occurs in the Section entitled "General Considerations;" and the principle is expressly applied to Plants as well as to Animals. In the Section on Respiration in Plants, a distinction is made between their true respiration (which is shown to be analogous to that of Animals), and the fixation of carbon from the atmosphere, which is characterised as a process of a different nature, independent, so far as is known, of mere physical laws.

The Reviewer then finds fault with the principle itself; being evidently ignorant that it has been recognised by most of the recent physiological writers. Professor Müller, for example, thus expresses himself:—"The interchange of the carbonic acid and oxygen in the lungs is wholly in accordance with the physical laws of the absorption of gases."—(Translation by Baly, vol. 1, p. 340). A little afterwards the Reviewer states as a *fact* "that the oxygen consumed is, as nearly as can be estimated, in the exact ratio of the carbonic acid thrown out." This might have passed very well twenty years ago; but every student now knows that the Reviewer's position has been long since overthrown; the independent experiments of Berthollet, Despretz, Dulong, Edwards, Collard de Martigny, Müller, and others, having united in proving that *much more* oxygen disappears than is contained in the carbonic acid of the expired air. Even Allen and Pepys, the only experimenters whose results can be opposed to these, noticed a considerable disappearance of oxygen in some of their experiments; but they set it down as accidental.

I trust that I have now sufficiently vindicated myself from the principal charges which the Reviewer has brought against me; and that I have proved his incompetency to pronounce an opinion upon the merits of my work. More than this it is not my desire to urge. And I shall conclude with again expressing my regret, at the necessity I have felt to make animadversions that so seriously affect the character of a Journal, which has rendered great services to Medical Science, and to which the Profession has been accustomed to look up with respect.

In justice to myself, I think it right to add the following confirmatory testimony from individuals whose authority on Theological questions, and in General Science, will give additional weight to my own statements. To all of these gentlemen the above Remarks have been submitted; and my only reason for not printing their replies in full, is that I am anxious to present them to the reader in the narrowest possible compass.

From the REV. J. PYE SMITH, D.D., Theological Tutor at Homerton Academy, to LANT CARPENTER, LL.D.

"As soon as I saw an account in the *Athenæum* of Dr. William Carpenter's Principles of Physiology, I ordered it of my bookseller. Had I not been, for more than five months, and were I not still, under the pressure of proximate duties, heavily augmented by the unexpected resignation of my theological colleague, I should have applied myself to the study of the work: I may say, I should have assiduously devoted myself to it, so far as necessary engagements would have permitted. I saw it to be such a book as I had long wished to see, and for many years had endeavoured to supply for myself, in a sort of composite manner, by adding book to book, and combining what I could learn from each in my own imperfect way of mental association. The plan of this volume at once attracted me; and I expected to find it the long-sought desideratum. It would be absurd for me to set myself up as qualified to sit in judgment

upon a consummate work of science, such as this is; but I am an humble votary of Natural History, not wholly a stranger to some portions of its domain, and *γηράσκω δὲ μαθητὸν*. All, however, that I have been able as yet to do, has been to read particular parts, to which I may have been directed by the rising of some subject of inquiry in my mind, or the casual occurrence of some topic to be pursued. But, when I have begun, I have found it difficult to lay down the book. The admirable distribution of its almost infinite mass of materials, the lucidness of its order, both as a whole and in its subordinate parts, its rich fullness yet close comprehensiveness, the care and success in laying down and maintaining clear conceptions of each object presented to the mind, its severely logical character in the determination of premises and the induction of conclusions, and its remarkably happy adjustment of mutual references in all the sections,—are qualities which give it a very high place in my esteem, and make a strong demand of gratitude to its accomplished author.

“Last night, after the foregoing lines were written, I became acquainted with the objections, which, in the last published number of the *Edinburgh Medical and Surgical Journal*, have been brought against the work of your talented son. This is a circumstance which exceedingly surprises and grieves me. You may well suppose it to be so, when I tell you that the very chapter upon which most of the animadversions are founded, is one of those which I had read with *peculiar* approbation and delight. It does appear a most extraordinary instance of careless observation or of designed perversion, to charge with being of an impious tendency a course of reasonings which, to my conviction, goes *exceedingly* to *exalt* our conceptions of the All-Perfect Deity. Dr. Wm. Carpenter has often directed our minds, in terms expressive of devout admiration, to the proofs and exemplifications of the Divine Attributes, as they arise out of instances of concatenated arrangement by him so well expounded; and I recollect one or two passages, though I cannot now turn to them, in which he acknowledges the invaluable blessing of a positive revelation of truths and prospects which our own unassisted minds could never have discovered. Our most deeply investigated views of the Divine Government lead to the conviction that it is exercised in the way of *order*, or what we usually call *law*. God reigns according to immutable principles, that is *by law*, in every part of his kingdom—the mechanical, the intellectual, and the moral; and it appears to be most clearly a position arising out of that fact, that a comprehensive germ which shall necessarily evolve all future developments, down to the minutest atomic movement, is a more suitable attribution to the Deity, than the idea of a necessity for irregular interferences.

“There are other parts of the animadversions in the *Journal* referred to, which rest upon such egregious inattention, to use a mild term, or sheer ignorance, that, when put into a proper light, they refute themselves. It is scarcely possible to suppose that any one of the eminent physicians or physiologists who, I believe, conduct that work, can have written the article. I would beg my young friend to make himself *perfectly easy* upon the case. The excellence and value of his work will only be displayed the more fully by this unjust attack.”

*From the REV. W. D. CONYBEARE, F.R.S., &c., &c., Vicar of Axminster,
to DR. WILLIAM B. CARPENTER.*

“To witness an aggression of such a nature as the attack on you in the *Edinburgh Medical and Surgical Journal*, must ever be painful to every liberal mind; but it is so utterly destitute of foundation that I think it cannot possibly be injurious to anything except the character of the journal in which it appears. With every word in your concluding paragraph I entirely concur. I have myself repeatedly expressed the same opinions, but never half so well or eloquently. The possibility of misapprehending your sentiments might have been removed by the

guarded explanation you have given of the term 'Law of Nature'; but the original paragraph is so very clear to my mind, that I cannot conceive it to stand in need of one syllable of further explanation.

"With regard to the distinctive nature of the Vital Principle as it is called, I cannot see anything of a dangerous tendency in any of the opinions you have advanced. The whole question is one obviously of Physiology, not of Psychology; for the Vital Principle under discussion is common to vegetable and animal natures, and therefore belongs to beings confessedly destitute, not only of spiritual, but even of any mental principle whatsoever."

From the REV. BADEN POWELL, F.R.S., &c., Savilian Professor of Mathematics in the University of Oxford.

"The attack made upon you does certainly appear to me most shameful; and so manifestly unfair as to carry its own refutation along with it to any candid person who has read your work.

"The particular parts now adverted to claimed my attention from the first; and as far as my opinion of the philosophical or logical character of the reasoning goes, I am most happy to give it. Having lately re-perused these chapters with great attention, I can most truly say that I remain fully impressed with a conviction, not only that no inference of any dangerous tendency can be fairly made from these, but that the subject is so illustrated as in my opinion to afford the firmest ground for establishing those higher conclusions to which you more especially advert in the last chapter.

"In particular, the meaning of the term 'Law of Nature,' the notion of the permanence and uniform action of the great mechanism of the universe down to its minutest parts, appears to me most perfectly to accord as well with the soundest philosophy as with the most elevated notions of the Divine Attributes. It appears to me, that the more the great questions connected with Natural Theology are *dispassionately* studied, the more will it be seen that such views as these are the real foundation on which its sublime conclusions rest."

From the REV. WILLIAM CLARK, M.D., Professor of Anatomy in the University of Cambridge.

"I much regret that you have reason to complain of the opinion which is published in the *Edinburgh Medical and Surgical Journal* of your Comparative Physiology; for I read your work, when it first appeared, with much delight, as that in which the greatest number of interesting facts, most ably digested, has yet been brought together in our language; and certainly with the impression that it strongly enforces upon the student the conviction of an omnipresent presiding First Cause—the benevolent Creator and Preserver of all things. In consequence of your letter, I have read the principal chapters over again, and still hold the same impressions regarding it. Consequently I am greatly surprised that charges should have been advanced against the religious tendency of your work; and cannot doubt that any candid person will, on even a cursory examination, find such charges to be altogether unfounded."

From the REV. J. S. HENSLOW, Professor of Botany in the University of Cambridge.

"I can see nothing in your account of the mode in which the Omniscent Creator may be supposed to interfere with the destiny of his creatures, that can be considered, in the smallest degree, as militating against the truths we derive from revelation. I can only suppose that the close and narrow-minded views with which some persons are apt to look upon the wonderful discoveries of modern times, prevent them from understanding how possible it is for a man to be duly impressed with the truths of revelation, though he is equally satisfied that they were never

intended to interfere with the freedom of his researches into those great natural laws by which God frames and governs the Universe and all that it contains."

From SIR JOHN F. W. HERSCHEL, F.R.S., &c., &c.

"It would appear to me very difficult to find wherewithal to accuse you of advancing an opinion that 'the visible creation was at first made so perfect that the machine of nature runs its allotted course without requiring the superintendence of the Creator'—an opinion which no man of common reason, or who is accustomed to assign meanings to the words he strings together, can for one moment entertain. As you require my opinion on this point, I am happy to afford it—not as a question of science, but as one of common sense, and logical interpretation of words."

From DR. ROGET, Secretary to the Royal Society, &c., &c.

"I have no hesitation in saying that nothing that I have met with in your work in any respect warrants the imputation of its doctrines having a dangerous tendency—an imputation, as it appears to me, ridiculous and wholly unfounded."

From DR. PRICHARD, F.R.S., &c., Bristol.

"I think you have fully vindicated yourself from a most unfounded accusation, which proves folly and ignorance, and even something worse, on the part of your anonymous assailant. You ought, in justice to yourself, to give all the publicity you can to the defence."

From DR. W. P. ALISON, F.R.S.E., Professor of Physiology in the University of Edinburgh.

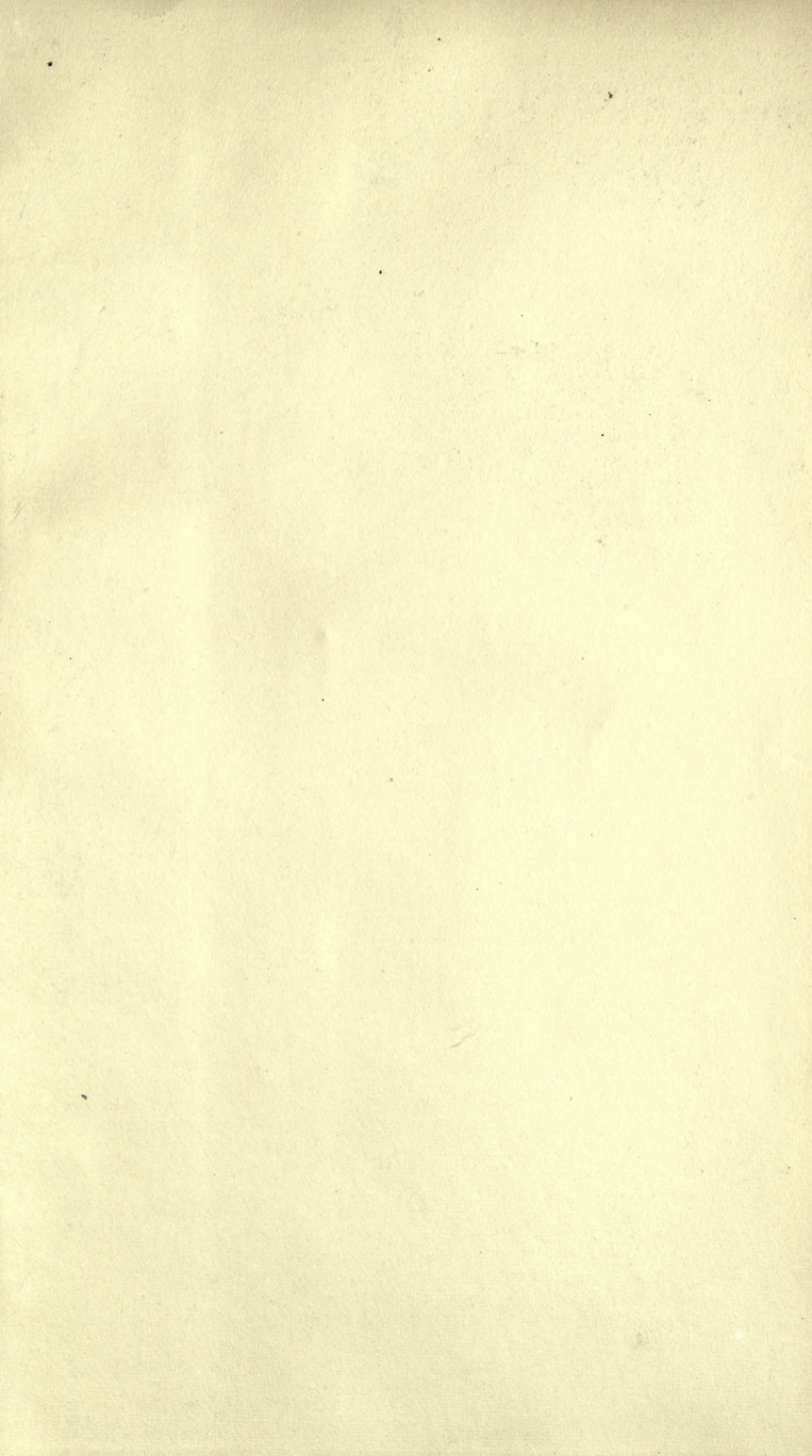
"I have never seen the slightest reason for changing the opinion which I stated in my Outlines, that no hypothesis which can be framed, as to the manner in which vital properties are communicated to organised beings, affects the conclusions in Natural Theology to which the study of these beings leads; because these conclusions rest upon principles altogether independent of any such hypotheses—on the principles that all change implies a cause, and that all adaptation of means to ends implies an intelligent cause."

"I can perfectly understand, therefore, and fully believe, that you, and others who hold similar language to yours, as to the connection of Life with Organisation, are equally impressed with the evidence of the great truths of Natural Religion, drawn from the study of Physiology, as those who use the language on the subject which seems to me more correct."

From DR. HOLLAND, Physician Extraordinary to the Queen, &c., &c.

"In reading your volume on the Principles of Physiology, I was struck, besides its other excellencies, with the tone of religious feeling which pervades the whole. The last chapter, on the proofs of design, impressed me strongly in this light. And in treating on the difficult and disputed questions regarding a vital principle, the laws of vital action, and the relations of the latter to physical laws commonly so termed—it seems to me that you have never exceeded the authorized bounds of physical research, as pursued by the most eminent physiologists."

"I will further add my general impression, that, whatever the differences of opinion on these particular topics, you have been careful, and have succeeded, in keeping them all in subjection to that First Great Cause, from which laws as well as phenomena are equally and solely derived."



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